Carleton University

1965|1966

Faculty of Arts
Faculty of Science
Faculty of Engineering
Faculty of Graduate Studies
School of Public Administration
School of International Affairs

How to Register

New full-time students enrolling for a degree, diploma, or certificate will take all of these steps.

New part-time students enrolling for a degree, diploma, or certificate will take steps 1, 2 and 5.

Returning full-time students will take steps 4 and 5.

All other students, including returning part-time undergraduates and graduate students, and part-time students not enrolling for a degree, diploma, or certificate, take step 5 only.

1 Complete application for admission on form available from the Registrar's Office. Applications should be submitted to the Registrar well in advance of term opening.

2 Attach certificates of former schooling (Matriculation and any studies pursued subsequently) to application for admission, or arrange for them to be sent to the Registrar.

3 When application has been approved, (a) arrange for physical examination by own physician and (b) have him report results to the University on the Personal Health Record form available from the Registrar's Office. This report must be completed and submitted to the University before final registration.

4 Prior to fall registration each year, submit evidence of having had a chest X-ray within six months prior to the opening of classes. This may be arranged, free of charge, at the May Court Clinic, 374 Besserer Street, Ottawa, any time after May 15. (Carleton students may be examined, except in July, on Tuesday, Wednesday, or Thursday, 1.30 to 4 p.m.) If examined elsewhere, furnish evidence of a negative report: (See also p. 233.) This evidence must be presented at registration.

5 During the appropriate registration period specified under The Academic Year (p. 1), come to the University to (a) arrange final selection of subjects, (b) complete registration forms, (c) pay fees, (see pp. 26-28) and (d) complete required aptitude tests (if new full-time students.)

6 Full-time students enrolling for the first time are to report to the University, Monday morning, September 13, at 9 o'clock.

The attention of all students is drawn to the additional fees required of late registrants, where late registration is permitted. (See p. 26.)

University office and library hours are listed inside the back cover.

As this Calendar is published several weeks before the opening of the session, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular courses.

Main Court, Rideau River Campus

Carleton University

Twenty-fourth Annual Calendar for the academic year 1965-66

Rideau River Campus
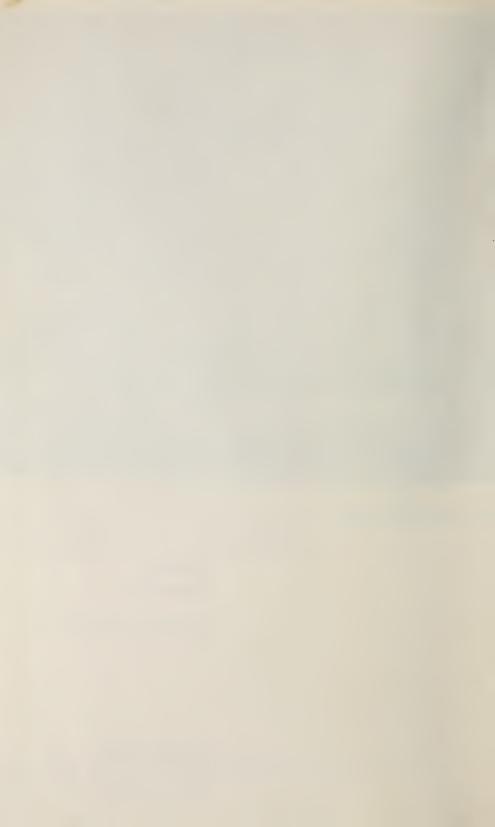Colonel By Drive
Ottawa 1
Telephone: 235-5161

Table of Contents

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The Academic Year

1966

January 6	Second term begins in day and evening divisions.
February 1	Last day for receiving applications for degrees from potential spring graduates.
February 15	Last day for formal withdrawal from courses.
April 8-10 (incl.)	Easter weekend. University closed.
April 20	Last day of classes in the second term, day and evening divisions.
April 25	Last day for handing in term assignments.
April 25-May 7	Final examinations in day and evening divisions.
May 27	Convocation for the conferring of degrees.

Calendar of Milestones

The Institution

1942	Ottawa Association for the Advancement of Learning established to develop Carleton College. At first the College offered only evening classes in introductory university subjects, with some courses in public administration.
1943	Ottawa Association for the Advancement of Learning incorporated.
1945	Beginning of day classes and full-time teaching. Establishment of the Faculty of Arts and Science, including courses in Journalism, and first year Engineering.
1946	Move from rented premises to the First Avenue campus, formerly Ottawa Ladies' College. First degrees awarded in Journalism and Public Administration.
1947	The College committed itself to complete pass and honours courses, the third year of the program being offered for the first time in 1947-48, the fourth year in 1948-49, and fifth (honours) year in 1949-50.
1949	First degrees in Arts, Science, and Commerce awarded. Formation of Senate.
1950	First honours degrees in Arts and Science awarded.
1952	The Carleton College Act 1952 passed by the Ontario Legislature. This changed the corporate name to Carleton College. It also confirmed the power to grant degrees.
1952-53	Property for new campus acquired.
1953	Establishment of the School of Public Administration.
1954	Appointment of Architectural Associates for Carleton to prepare first master plan and to design first group of buildings. First honorary degree of LL.D. conferred on Dag Hammarkskjold, Secretary-General of the United Nations.
1955	First Master's degree awarded.
1957	The Carleton University Act, 1957. Establishment of the School of Engineering. Establishment of the Institute of Canadian Studies.
1959	Move to Rideau River campus, following construction of the Henry Marshall Tory Building (science), the Maxwell MacOdrum Library, and the Norman Paterson Hall (arts).

1961	First degrees in Engineering awarded. First Ph.D. degree awarded.
1962	Southam Hall, the University Commons, Renfrew House (women's residence) and Lanark House (men's residence) completed. Paterson Hall extended and University Centre opened.
1963	Reorganization into Faculties of Arts, Engineering, Science, and Graduate Studies. Three-storey extension to MacOdrum Library completed.
1964	The C. J. Mackenzie Building (engineering) completed.

Presidents

1942-1947	Henry Marshall Tory.
1947-1955	Murdoch Maxwell MacOdrum.
1955-1956	James Alexander Gibson (acting).
1956-1958	Claude Thomas Bissell.
1958-	Arnold Davidson Dunton.

Chancellors

1952-54	Harry Stevenson Southam.
1954-	Chalmers Jack Mackenzie.

Enrolment

In the winter session 1964-65 in day and evening divisions the total enrolment was 4789, comprising 2690 full-time students and 2099 part-time students in courses offered for academic credit; and 1327 registered in non-academic courses.

Senate of the University

President Davidson Dunton, LL.D., D.SC.
Dean M. S. Macphail, M.A., D.PHIL., F.R.S.C.
Dean H. H. J. Nesbitt, M.A., PH.D., D.SC., F.L.S., F.Z.S.
Dean John Ruptash, B.SC., M.A.SC., PH.D.
Dean D. M. L. Farr, M.A., D.PHIL.
Professor R. O. MacFarlane, M.A., PH.D.
Professor Wilfrid Eggleston, M.B.E., B.A., F.A.G.S.
Professor H. Scott Gordon, A.M., PH.D.
Professor John M. Morton, M.SC., M.A., PH.D., F.C.I.C.
Professor Munro Beattie, A.M., PH.D.
Professor Donald C. Rowat, A.M., PH.D.
Professor J. M. Holmes, B.SC., M.A., PH.D.
Professor George B. Johnston, M.A.
Professor James C. S. Wernham, M.A., S.T.M.
Professor Robert L. McDougall, M.A., PH.D.
Professor F. H. Northover, M.A., PH.D.
Professor John Porter, B.SC. (ECON.)
Professor Bernard Wand, M.A., PH.D.
Professor William H. Bowes, M.E., M.SC.
Professor F. K. North, M.A., D.PHIL.
Professor J. S. Tassie, M.A., PH.D.
Professor K. D. McRae, A.M., PH.D.
Professor G. C. Merrill, M.A., PH.D.
Professor George Setterfield, B.A., PH.D.
Professor E. P. Hincks, M.A.
Professor A. J. Earp, M.A., M.LITT.
Professor D. G. Anglin, M.A., D.PHIL.
Professor P. R. Beesack, A.M., PH.D.
Professor D. K. Dale, B.A., M.S.
Professor M. A. Gullen, B.SC., M.S.
Professor S. F. Kaliski, M.A., PH.D.
Professor P. M. Laughton, B.A., M.SC., PH.D.
Professor D. A. J. Millar, B.A.SC., M.E., SC.D.
Professor M. K. Sundaresan, M.SC., PH.D.
Professor F. G. Vallee, B.A., PH.D.
Professor R. A. Wendt, M.A.

Term Appointments

Until 1966
Associate Professor S. R. Mealing, M.A., B.LITT.
Associate Professor W. Tupper, M.SC., PH.D.

Until 1967
Associate Professor T. J. S. Cole, B.SC., PH.D.
Associate Professor B. W. Jones, A.M., PH.D.
Associate Professor L. M. Read, M.A.

Until 1968
Associate Professor D. A. George, B.ENG., M.S., SC.D.
Associate Professor G. S. Couse, B.A., PH.D.
Associate Professor B. A. McFarlane, M.A., PH.D.

Officers of Instruction

Professors, Associate Professors, Assistant Professors, Lecturers

Richard D. Abbott, B.A. Carleton, LL.B. Queen's,
Assistant Professor of Public Law

C. H. Amberg, M.A. Queen's, PH.D. Toronto,
Associate Professor of Chemistry

Duncan M. Anderson, B.S.A. O.A.C., M.SC. Western Ontario,
Assistant Professor of Geography

J. M. Anderson, B.SC.F., PH.D. Toronto,
Associate Professor of Biology

Douglas G. Anglin, B.A. Toronto, M.A., D.PHIL. Oxford,
Professor of Political Science

J. W. ApSimon, B.SC., PH.D. Liverpool,
Assistant Professor of Chemistry

Francisco Atienza, B.T. Salamanca, LIC.T. Innsbruck, LIC.J.C. Rome, D.J.C. Ottawa,
D.S.T. Ottawa,
Assistant Professor of Spanish

J.-P. Baril, B.A. Montreal, B.ED. Ottawa,
Assistant Professor of French

Isabel Law Bayly, B.SC. Carleton, M.A. Toronto,
Assistant Professor of Biology

Alexander Munro Beattie, B.A. Toronto, A.M., PH.D. Columbia,
Professor of English

Dolores Bedingfield, M.A. Memorial,
Lecturer in English

W. T. Bedwell, M.A. Manitoba,
Lecturer in English

Paul R. Beesack, B.A. McMaster, A.M., PH.D. Washington.
Professor of Mathematics (on leave of absence, 1965-66)

David Karl Bernhardt, B.A. Toronto, M.A. Michigan,
Assistant Professor of Psychology

Thomas W. Betz, M.A. Missouri,
Assistant Professor of Biology

Gordon W. Bigg, B.SC. Alberta, M.SC. Illinois,
Assistant Professor of Engineering

F. W. Black, B.SC.(M.E.) Manitoba, M.A.SC. Toronto,
Assistant Professor of Engineering

Desmond G. Bowen, B.A. Carleton, M.A., PH.D. Queen's,
Associate Professor of History (on leave of absence, 1965-66)

William H. Bowes, M.E. Nova Scotia Tech.,
M.SC. Michigan,
Professor of Engineering

Thomas Newton Brewis, M.COM., PH.D. Durham,
Associate Professor of Economics

Neil M. Brice, M.SC. Queensland, PH.D. Stanford,
Assistant Professor of Engineering

Adam Bromke, M.A. St. Andrews, PH.D. Montreal and McGill,
Associate Professor of Political Science

Hyman Burshtyn, M.A. McGill,
Assistant Professor of Sociology

Elinor J. Burwell, B.A. Toronto, M.A. Carleton,
Lecturer in Psychology

Richard Lee Carson, M.A. Minnesota, PH.D. Indiana
Assistant Professor of Economics
A. L. Carter, M.SC. Dalhousie, PH.D. McGill,
Associate Professor of Physics
R. Caterina, B.COM. Toronto, M.B.A. New York, C.A.,
Associate Professor of Accounting
J. C. Cederstrom, A.B. Duke, M.A. Wisconsin,
Lecturer in English
G. Y. Chao, M.SC., PH.D. Chicago,
Assistant Professor of Geology
E. U. Choudhri, M.A. Panjab,
Assistant Professor of Economics
Richard W. Cockfield, M.SC. Queen's,
Lecturer in Engineering
T. James S. Cole, B.SC. London, B.SC. Carleton, PH.D. Cambridge, A.C.G.I.,
Associate Professor of Physics
J. Nicoll Cooper, B.A. Harvard, M.A. Michigan,
Assistant Professor of History
Miles A. Copeland, B.SC. Manitoba, M.A.SC. Toronto,
Assistant Professor of Engineering
George Douglas Cormack, B.A.SC., M.SC., PH.D. British Columbia,
Assistant Professor of Engineering
T. H. Coulson, B.A. Oxford,
Visiting Associate Professor of English
Gordon S. Couse, B.A. McMaster, PH.D. Chicago
Associate Professor of History
Douglas Keith Dale, B.A. Queen's, M.S. North Carolina,
Professor of Mathematics
Marjorie N. Donald, M.A., DIP.EDUC. New Zealand, PH.D. Michigan,
Associate Professor of Psychology
A. J. Earp, B.A. Toronto, M.A. Cincinnati, M.LITT. Cambridge,
Professor of Classics
Wilfrid Eggleston, M.B.E., B.A. Queen's, F.A.G.S.,
Professor of Journalism
André Elbaz, L. ès L., Bordeaux,
Lecturer in French
H. Edward English, B.A. British Columbia, PH.D. California,
Associate Professor of Economics (on leave of absence, 1965-66)
David M. L. Farr, B.A. British Columbia, M.A. Toronto, D.PHIL. Oxford,
Professor of History
Charles Paul Fleischauer, A.M., PH.D. Harvard,
Associate Professor of French
Jean P. Fletcher, M.A., PH.D. Toronto,
Lecturer in Biology
J. M. Forrest, B.SC. New Brunswick, M.A.SC., British Columbia,
Assistant Professor of Engineering
K. Arnold Frenzel, B.A. Pacific Lutheran, M.A. Washington,
Assistant Professor of Economics
Muni C. Frumhartz, B.A. Toronto, A.M. Columbia,
Associate Professor of Sociology (on leave of absence, 1965-66)
Michael G. Fry, B.SC. (ECON.), PH.D. London,
Assistant Professor of History
Maria A. Fürstenwald, B.A. Sir George Williams, M.A., PH.D. McGill,
Assistant Professor of German

R. Bruce Gamble, B.SC. McGill,
Lecturer in Mathematics
Cyril W. L. Garner, B.SC. New Brunswick, M.A. Toronto, PH.D. Toronto,
Assistant Professor of Mathematics
D. A. George, B.ENG. McGill, M.S. Stanford, SC.D. M.I.T.,
Associate Professor of Engineering
Amal Chandra Ghosh, M.SC. Calcutta, PH.D. McGill,
Associate Professor of Physics
W. Irwin Gillespie, B.A. Western Ontario, PH.D. Johns Hopkins,
Assistant Professor of Economics
Madeleine Gobeil, B.A. Ottawa, M.A. McGill,
Lecturer in French
R. B. Goheen, B.A. Toronto, M.A. Yale,
Assistant Professor of History
John A. Goldak, M.SC., PH.D. Alberta,
Assistant Professor of Engineering
Daniel Goldstick, B.A. Toronto, B.PHIL. Oxford,
Lecturer in Philosophy
H. Scott Gordon, B.A. Dalhousie, A.M. Columbia, PH.D. McGill,
Professor of Economics
Robert D. Gould, B.A. Oxford, M.A. Princeton,
Lecturer in German
John E. Graham, B.SC. Carleton, M.A. Queen's, M.S., PH.D. Iowa State,
Assistant Professor of Mathematics
Naomi E. S. Griffiths, B.A. London, M.A. New Brunswick,
Assistant Professor of History
Malcolm A. Gullen, B.SC. Edinburgh, M.S. Purdue,
Professor of Engineering
Stanley S. Guterman, A.B. Chicago,
Assistant Professor of Sociology
Ralph C. G. Haas, M.SC. Alberta,
Assistant Professor of Engineering
Charles Haines, M.A. Dublin,
Assistant Professor of English
Maureen M. Hanna, M.A., B.LITT. Oxford,
Assistant Professor of English
James E. Hardy, M.SC. British Columbia, PH.D. Princeton,
Assistant Professor of Physics
Keith A. J. Hay, B.SC. Southampton, M.SC. Toronto,
Assistant Professor of Economics
Marianne Helfenstein, B.SC. Alberta,
Lecturer in Mathematics
John M. Hems, M.A. Glasgow, PH.D. Aberdeen,
Assistant Professor of Philosophy
T. J. Henighan, B.A. St. John's, N.Y., M.LITT. Durham,
Lecturer in English
Patrick Arthur Hill, B.SC. London, PH.D. Columbia, F.G.S., F.P.S., F.R.G.S.,
Associate Professor of Geology
Edward P. Hincks, M.A. Toronto,
Professor of Physics
A. Trevor Hodge, M.A., PH.D. Cambridge,
Associate Professor of Classics
James M. Holmes, B.SC. New Brunswick, M.A. Western Ontario, PH.D. McGill, F.C.I.C.,
Professor of Chemistry

Kenneth Hooper, M.SC. London, F.G.S.,
Assistant Professor of Geology
T. Murray Hunter, B.A. British Columbia, A.M. Clark,
Assistant Professor of History
William Irwin Illman, B.A., M.SC., PH.D. Western Ontario,
Associate Professor of Biology (Botany)
Richard L. Jackson, B.A. Knoxville, M.A., PH.D. Ohio State,
Assistant Professor of Spanish
Robert J. Jackson, M.A. Western Ontario,
Assistant Professor of Political Science
Andrew Jeffrey, M.A. St. Andrews,
Assistant Professor of Philosophy
Pauline Jewett, M.A. Queen's, PH.D. Harvard, M.P.,
Associate Professor of Political Science (on leave of absence, 1965-66)
J. Peter Johnson, Jr., A.B. Dartmouth, A.M. Clark, PH.D. McGill,
Associate Professor of Geography
George B. Johnston, M.A. Toronto,
Professor of English
Benjamin W. Jones, B.A. Grinnell, A.M. Columbia, PH.D. Iowa,
Associate Professor of English
Frederick J. E. Jordan, B.COM., LL.B., British Columbia
Assistant Professor of Public Law
José Jurado, DR. en LETRAS (Madrid),
Assistant Professor of Spanish
Stephan F. Kaliski, B.A. British Columbia, M.A. Toronto, PH.D. Cambridge,
Professor of Economics
William B. Kay, M.A. Toronto,
Assistant Professor of French
E. F. Kaye, M.A. Christchurch, N.Z., LIC. ès L. Dijon, D. ès L. Besançon,
Associate Professor of French
Wilfred H. Kesterton, B.A. Queen's, B.J. Carleton,
Associate Professor of Journalism
Peter John King, M.A. Cambridge, A.M., PH.D. Illinois,
Assistant Professor of History
Kenneth Kitchen, B.A. Nottingham,
Assistant Professor of Political Science (on leave of absence, 1965-66)
J. A. Koningstein, PH.D. Amsterdam,
Assistant Professor of Chemistry
Peeter Kruus, B.SC. Toronto, LIC.TECH. Denmark,
Assistant Professor of Chemistry
Eva M. Kushner, M.A., PH.D. McGill,
Associate Professor of French
Marston LaFrance, B.A. Harpur, M.A. Cornell, PH.D. Wisconsin,
Associate Professor of English
Paul MacDonell Laughton, B.A. Toronto, M.SC. Dalhousie, PH.D. Wisconsin,
Professor of Chemistry
Pierre Laurette, L. ès L. Lille, D. ès L. Sarrebrucke,
Assistant Professor of French
A. Bryan Laver, M.A. Queen's, PH.D. Ottawa,
Assistant Professor of Psychology
John W. Leyden, B.A. Keele,
Lecturer in Philosophy
N. H. Lithwick, B.A. Western Ontario, PH.D. Harvard,
Assistant Professor of Economics

John E. R. Lloyd, M.A. Cambridge,
Assistant Professor of Russian (on leave of absence, 1965-66)
G. Ross Love, M.A. Western Ontario, PH.D. Toronto,
Associate Professor of Physics
Ronald Oliver MacFarlane, M.A. Queen's, PH.D. Harvard,
Professor of Political Science
Moray St. John Macphail, B.A. Queen's, M.A. McGill, D.PHIL. Oxford, F.R.S.C.,
Professor of Mathematics
William M. Mansour, B.SC. Cairo, M.A.SC., PH.D. Toronto,
Assistant Professor of Engineering
Robert R. March, B.A. Manitoba, M.A. Carleton,
Assistant Professor of Political Science
Christopher Marsden, M.A., PH.D. Cambridge,
Assistant Professor of Spanish
Marilyn Marshall, B.A. Lake Erie, M.A. Bowling Green, PH.D. Iowa,
Assistant Professor of Psychology
Peter D. McCormack, B.A. Carleton, M.A. Delaware, PH.D. Iowa,
Associate Professor of Psychology
Duncan McDougall, B.A. Queen's, PH.D. Johns Hopkins,
Associate Professor of Economics
Robert L. McDougall, B.A. British Columbia, M.A., PH.D. Toronto,
Professor of English (on leave of absence, 1965-66)
Bruce A. McFarlane, M.A. McGill, PH.D. London,
Associate Professor of Sociology
Alan D. McLay, B.A. McMaster, M.A. New Brunswick,
Assistant Professor of English
Kenneth Douglas McRae, B.A. Toronto, A.M., PH.D. Harvard,
Professor of Political Science (on leave of absence, 1965-66)
Stanley R. Mealing, B.A. Alberta, M.A., B.LITT. Oxford,
Associate Professor of History
George Melnikov, LIC. *ès* LETT. Lyon, C.A.P.E.S. Nancy and Aix-Marseille,
Assistant Professor of Russian
Gordon Clark Merrill, M.A. McGill, PH.D. California,
Professor of Geography
Thomas J. Middlebro', M.A. Toronto,
Assistant Professor of English
Douglas A. J. Millar, B.A.SC. British Columbia, M.E., SC.D. M.I.T.,
Professor of Engineering
Jean Miquet, M.A. London, L. ès L. Paris,
Lecturer in French
John M. Moore, Jr., B.SC. Manitoba, PH.D. M.I.T.,
Assistant Professor of Geology
John M. Morton, M.SC. Dalhousie, M.A., PH.D. Princeton, F.C.I.C.,
Professor of Chemistry
Vaclav Mudroch, B.A. British Columbia, M.A., PH.D. Toronto,
Associate Professor of History (on leave of absence, 1965-66)
H. Blair Neatby, B.A. Saskatchewan, M.A. Oxford, PH.D. Toronto,
Associate Professor of History
Brian G. Nemes, B.SC. Manitoba,
Lecturer in Mathematics
Herbert H. J. Nesbitt, B.A. Queen's, M.A., PH.D. Toronto, D.SC. Leiden, F.L.S., F.R.E.S.,
F.Z.S.,
Professor of Biology

Edward J. Norminton, M.A. Western,
Assistant Professor of Mathematics
F. K. North, M.A., D.PHIL. Oxford,
Professor of Geology
F. H. Northover, M.A. Cambridge, PH.D. London,
Professor of Mathematics
Ernst M. Oppenheimer, B.A. Toronto, M.A. Columbia, PH.D. Harvard,
Associate Professor of German
Fernand Ouellet, B.A., D. ès L. Laval,
Professor of History
Khayyam Z. Paltiel, B.A. McGill, M.A. Toronto, PH.D. Jerusalem,
Associate Professor of Political Science
Gilles Paquet, M.A. Laval,
Assistant Professor of Economics
Michael Parris, M.A., D.PHIL. Oxford,
Assistant Professor of Chemistry
Peter C. Pineo, B.A. British Columbia, M.A. McGill, PH.D. Chicago,
Associate Professor of Sociology
John Porter B.SC. ECON. London,
Professor of Sociology
B. M. Puttaswamaiah, M.SC. Mysore, M.A., PH.D. Toronto,
Assistant Professor of Mathematics
Mizanur Rahman, M.SC. Dacca, M.A. Cambridge,
Assistant Professor of Mathematics
George W. Ramsey, A.B. Davidson, B.D. Union Theological Seminary,
Lecturer in Religion
Raoul Ravano, PROF. DE INGLES, Chile,
Lecturer in Spanish
Lawrence M. Read, B.A. Dalhousie, M.A. Toronto,
Associate Professor of Religion
Harald von Riekhoff, B.A. Western, M.A., PH.D. Yale,
Assistant Professor of Political Science
Anne Replogle, B.A. Hollins, M.A. McGill,
Assistant Professor of Psychology
T. R. Robinson, M.A. Queen's, Belfast,
Lecturer in Classics
George Roseme, A.B. California, M.A. Sacramento State,
Assistant Professor of Political Science
Paul L. Rosen, B.A. Lehigh, M.A. New School for Social Research,
Assistant Professor of Political Science
Donald C. Rowat, B.A. Toronto, A.M., PH.D. Columbia,
Professor of Political Science
John Ruptash, B.SC. Alberta, M.A.SC., PH.D. Toronto,
Professor of Engineering
Thomas K. Rymes, B.A. Manitoba, M.A. McGill,
Assistant Professor of Economics
T. Joseph Scanlon, B.J., D.P.A. Carleton, M.A. Queen's,
Assistant Professor of Journalism
Guenther F. Schaefer, M.A. Vanderbilt,
Assistant Professor of Political Science
William Robert Scott, B.COM. Carleton, C.A.,
Assistant Professor of Accounting
R. J. Semple, M.A. Toronto, PH.D. *Princeton,*
Associate Professor of Mathematics

George Setterfield, B.A. British Columbia, PH.D. Wisconsin,
Professor of Biology
Derek William Sida, M.SC., PH.D. London, F.R.A.S.,
Associate Professor of Mathematics
Donald Alan Smith, M.A., PH.D. Toronto,
Associate Professor of Biology (Zoology)
Brian J. Spenceley, M.A. Virginia,
Assistant Professor of Physics
James Steele, M.A. Toronto, PH.D. London,
Assistant Professor of English
Michael Stein, B.A. McGill, M.A. Princeton,
Assistant Professor of Political Science
R. A. C. Stewart, B.A. Wellington, ED.M. Harvard,
Lecturer in Psychology
Lloyd H. Strickland, A.B. Johns Hopkins, PH.D. North Carolina,
Associate Professor of Psychology
John W. Strong, B.A. Colby, M.A. Boston, PH.D. Harvard,
Assistant Professor of History
M. K. Sundaresan, M.SC., Delhi, PH.D. Cornell,
Professor of Physics
F. Ellenor M. Swallow, M.A. Alberta, PH.D. Cornell,
Associate Professor of Classics
Michael Tait, M.A. Toronto,
Lecturer in English
R. Stephen Talmage, M.A. Oxford,
Associate Professor of Philosophy
Gregory Tanyi, B.SC., M.S. Illinois Inst. Tech., PH.D. Toronto,
Assistant Professor of Mathematics
James S. Tassie, B.A. McMaster, M.A., PH.D. Toronto,
Professor of French
Mary Jane Taylor, B.A. St. Mary of the Springs, M.A. Georgetown,
Lecturer in History
James M. Thompson, M.A. Toronto,
Assistant Professor of Philosophy (on leave of absence, 1965-66)
Alistair Tilson, M.A. St. Andrews, B.LITT. Oxford,
Lecturer in English
Trevor Tolley, B.A. Oxford,
Assistant Professor of English
Marcel Trudel, L. ès L., D. ès L. Laval,
Professor of History
William M. Tupper, M.SC. New Brunswick, PH.D., M.I.T.,
Associate Professor of Geology
Philip E. Uren, M.A. McGill,
Associate Professor of Geography
Victor F. Valentine, M.A. Toronto,
Associate Professor of Sociology
Francis G. Vallee, B.A. McGill, PH.D. London,
Professor of Sociology
Karl Van Dalen, B.SC. Queen's, D.I.C., M.SC. London,
Assistant Professor of Engineering (on leave of absence, 1965-66)
Paul Varnai, M.A. Montreal,
Lecturer in Russian
Frank Robert Wake, B.A., PH.D. McGill,
Associate Professor of Psychology

14

W. E. Walther, B.A. Chico State, M.SC. San Diego State, PH.D. Iowa,
Assistant Professor of Psychology
Bernard Wand, B.A. Queen's, M.A., PH.D. Cornell,
Professor of Philosophy
John A. Webb, B.SC., PH.D. London,
Associate Professor of Biology
Russell Allan Wendt, M.A. Alberta,
Professor of Psychology
James C. S. Wernham, M.A. Aberdeen and Cambridge, S.T.M. Union,
Professor of Philosophy
Donald R. Whyte, B.SC. Manitoba, M.SC., PH.D. Cornell,
Assistant Professor of Sociology
Frank Wightman, B.SC., PH.D. Leeds,
Associate Professor of Biology (Botany) (on leave of absence, 1965-66)
R. H. Wightman, B.SC., PH.D. New Brunswick,
Assistant Professor of Chemistry
D. R. Wiles, B.SC. Mount Allison, M.SC. McMaster, PH.D. M.I.T.,
Associate Professor of Chemistry
A. M. Willms, B.A., B.ED. Alberta, M.A. Toronto and Carleton,
Associate Professor of Political Science
Gordon James Wood, M.A. Toronto,
Associate Professor of English (on leave of absence, 1965-66)
Whitman Wright, B.A.SC. Toronto, M.C.E. Illinois,
Associate Professor of Engineering
D. J. Wurtele, B.A. London, M.A. McGill,
Lecturer in English
Raymond W. Yole, B.SC. New Brunswick, M.A. John Hopkins, PH.D. British Columbia,
Assistant Professor of Geology
Lorna D. Young, B.A. Carleton, M.A. Rochester, PH.D. Dublin,
Assistant Professor of English

Sessional Lecturers, Instructors, Demonstrators, and others
R. Aksim, B.A. Western Ontario,
Sessional Lecturer in German*
Marjorie Allen, B.SC. Columbia, M.SC. Northwestern,
Special Lecturer in Geology*
W. Anderson, M.SC. Saskatchewan, PH.D. Chicago,
Sessional Lecturer in Economics*
Elizabeth M. Arnason, M.S. Purdue, PH.D. Illinois,
Demonstrator in Biology*
Frances Oakes Baldwin, B.A. Saskatchewan, B.J. Carleton,
Sessional Lecturer in Journalism*
R. L. Beatty, B.A. Toronto,
Sessional Lecturer in Mathematics*
A. Bégin, B.A. Ottawa and Carleton, B.SC. Ottawa,
Sessional Lecturer in Spanish*
G. Belkov, M.A. British Columbia,
Sessional Lecturer in Russian*
Baiba Benkis, B.A. New York, M.A. Carleton,
Sessional Lecturer in French*
Clifford J. Berschneider, B.A. Duquesne, M.A. Pittsburgh,
Sessional Lecturer in History*

*Part time

Robert L. Borden, M.SC. Alberta, M.B.A. Western, P.ENG.,
Sessional Lecturer in Geology*
Jaroslav A. Boucek, B.A. Sir George Williams, M.A. Montreal, PH.D. Ottawa,
Sessional Lecturer in History*
R. W. Boyle, M.A.SC., PH.D. Toronto, F.R.S.C.,
Special Lecturer in Geology*
Alexander Brady, B.A. Toronto, M.A., PH.D. Oxford,
Visiting Professor of Political Science*
C. N. Brennan, B.COM. British Columbia, M.S. Columbia, C.A.,
Sessional Lecturer in Accounting*
Donald W. Brooks, B.SC. Queen's,
Sessional Lecturer in Engineering*
Irene Brownstein, B.S. Queen's College, New York, M.S. Chicago,
Sessional Lecturer in Chemistry*
Elizabeth Butterill, B.A. Western Ontario,
Senior Demonstrator in Physics*
Gordon D. Campbell, B.SC. Manitoba, M.S.C.E., PH.D. Purdue,
Sessional Lecturer in Engineering*
D. M. Caughey, B.SC. New Brunswick, D.I.C., PH.D. London,
Sessional Lecturer in Engineering*
Marcus S. Chappell, B.A.SC. British Columbia,
Sessional Lecturer in Engineering*
José C. Claros, PH.D. Madrid,
Sessional Lecturer in Spanish*
E. P. Cockshutt, B.A.SC. Toronto, S.M., MECH.ENG., SC.D. M.I.T.,
Sessional Lecturer in Engineering*
David C. Coll, M.ENG. McGill,
Sessional Lecturer in Engineering*
Jean Collins, M.A. McGill,
Instructor in English*
Hildegarde Corbet, B.A. Carleton,
Sessional Lecturer in German*
Murray E. Corlett, Q.C., B.A. Toronto,
Sessional Lecturer in Public Law*
Norman DePoe,
Seminar Leader in Journalism*
E. H. Dudgeon, M.A.SC. Toronto,
Sessional Lecturer in Engineering*
G. S. DuVernet, M.A. Toronto,
Sessional Lecturer in French*
Simon L. Eckstein, B.A., B.R.E. Yeshiva, M.A. New York,
Sessional Lecturer in Religion*
J. Duncan Edmonds, B.A. Toronto,
Sessional Lecturer in Political Science*
Bela Egyed, B.A. Sir George Williams,
Sessional Lecturer in Philosophy*
R. T. Elworthy, M.B.E., B.SC., PH.D. London,
Senior Demonstrator in Chemistry*
Thomas Farley, M.A. Carleton,
Sessional Lecturer in English*
Ivan Fellegi, M.SC., PH.D. Carleton,
Sessional Lecturer in Mathematics*

*Part time
16

Mary-Lou E. Florian, B.A. British Columbia, M.A. Texas,
Sessional Lecturer in Biology*
J. Keith Fraser, B.A. Toronto, PH.D. Clarke,
Sessional Lecturer in Geography*
Eugene A. Forsey, M.A. McGill and Oxford, PH.D. McGill, LL.D. New Brunswick,
Sessional Lecturer in Political Science*
William Fraser, B.A. Carleton,
Sessional Lecturer in French*
Barbara Gaizauskas, M.A. Toronto,
Demonstrator in Physics*
James C. Gardner, B.A., M.ED. Toronto,
Sessional Lecturer in Mathematics*
B. Goreloff, M.A. Montreal,
Sessional Lecturer in Russian*
Allan Gotlieb, B.A. California, M.A., B.C.L. Oxford, LL.B. Harvard,
Sessional Lecturer in Political Science*
Donald G. Gould, M.A.SC., PH.D. Toronto,
Sessional Lecturer in Engineering*
Ronald Grantham, M.A. British Columbia,
Sessional Lecturer in History*
Jean Griffin, B.SC. Mount Allison,
Senior Demonstrator in Chemistry*
J. Guthrie, B.SC. Dalhousie,
Senior Demonstrator in Chemistry*
C. D. Hall, B.ENG. McGill, M.SC., PH.D. Saskatchewan,
Sessional Lecturer in Engineering*
Walter B. Herbert, B.A., LL.B. Alberta,
Seminar Leader in Journalism*
D. J. Herbertson, B.SC. Carleton,
Senior Demonstrator in Chemistry*
Gerd Hermodssen, B.A. Lund,
Sessional Lecturer in German*
Peter J. Hood, B.SC. London, M.A., PH.D. Toronto,
Sessional Lecturer in Geology*
Lillian Jackson, M.A. Ohio State,
Sessional Lecturer in Spanish*
J. P. Jan, M.SC., PH.D. Lausanne,
Sessional Lecturer in Physics*
J. Keith Johnson, M.A. Toronto,
Sessional Lecturer in History*
Dorothy Judge, B.A. McGill,
Instructor in English*
W. A. Karney, B.COM. Alberta, C.A.,
Sessional Lecturer in Accounting*
Leslie Kaye, B.A. Carleton,
Chief Demonstrator in Geology
George J. Klein, B.A.SC. Toronto,
Sessional Lecturer in Engineering*
John Kuiper, M.A. Netherlands School of Economics,
Sessional Lecturer in Economics*
Albert B. Larose, B.COM. Carleton, C.A.,
Sessional Lecturer in Accounting*

*Part time

C. W. Leggatt, B.S.A. Toronto, M.SC. Alberta, PH.D. Toronto, F.A.I.C.,
Demonstrator in Biology*
G. Lemke, B.A. McMaster,
Sessional Lecturer in German*
G. LeSueur, B.A. Toronto,
Sessional Lecturer in Mathematics*
Stephen Alan Longstaff, B.A. McGill,
Sessional Lecturer in Sociology*
A. Lozano, B.A. Sir George Williams, M.A. Middlebury,
Sessional Lecturer in Spanish*
Robert Alexander MacKay, B.A. Toronto, PH.D. Princeton, LL.D. Dalhousie, F.R.S.C.,
Visiting Professor of Political Science*
P. Mandl, M.A., PH.D. Toronto,
Sessional Lecturer in Engineering*
John Marlyn,
Seminar Leader in Journalism*
Campbell McDonald, B.A. Western Ontario,
Seminar Leader in Journalism*
Isobel McKenna, B.A. Toronto,
Instructor in English*
Raymond F. Meyer, B.ENG. New Zealand, PH.D. Manchester,
Sessional Lecturer in Engineering*
J. C. Mills, M.A. Manitoba,
Sessional Lecturer in Economics*
Nathan Moore, B.A. Rockford,
Sessional Lecturer in English*
C. Moser, M.SC. Zurich,
Sessional Lecturer in Mathematics*
E. R. Niblett, M.SC. Toronto, PH.D. Cambridge,
Sessional Lecturer in Geology*
Perry Nodelman, M.A. Yale,
Sessional Lecturer in English*
M. J. O'Grady, LL.B. Queen's, LL.M. Harvard,
Sessional Lecturer in Public Law*
William G. Ormsby, M.A. Carleton,
Sessional Lecturer in History*
D. F. Page, B.SC. Queen's, D.I.C., PH.D. London,
Sessional Lecturer in Engineering*
Lorraine Painter, B.A. Carleton,
Sessional Lecturer in Spanish*
Madeleine Pelletier, B.A. Ottawa,
Sessional Lecturer in Spanish*
Grace Powell, B.A., M.SC. Alberta,
Sessional Lecturer in Geography
Jutta Prager, DR.PHIL. Potsdam,
Sessional Lecturer in German*
Virginia Prince, B.A. Toronto,
Sessional Lecturer in Chemistry*
William T. Rainbird, B.ENG. Canterbury, D.C.A. Cranfield,
Sessional Lecturer in Engineering*
Vera Rolko, B.SC. Manitoba,
Senior Demonstrator in Chemistry*

*Part time

Anna M. Rosenberg, B.A. Memorial,
Sessional Lecturer in German*
N. G. Ross, B.A. Toronto, C.A.,
Sessional Lecturer in Accounting*
R. Ruedy, PH.D. Geneva,
Senior Demonstrator in Physics*
Grace Sangster, B.A. Toronto,
Senior Demonstrator in Physics*
P. W. Sargeant, B.SC. Carleton,
Senior Demonstrator in Physics
Ernest Small, B.A. Carleton,
Sessional Lecturer in Biology*
Harold W. Smith, B.A.SC. Toronto, SC.D. M.I.T.,
Sessional Lecturer in Engineering*
James A. Soles, M.SC. British Columbia, PH.D. McGill,
Sessional Lecturer in Geology*
Ilse Sprung,
Sessional Lecturer in German*
A. A. Sterns, LIC. COM. St. Gallen, DR.RER.POL. Berne,
Sessional Lecturer in Accounting*
E. Stichling, DIPL.PHILOL. Stavropol,
Special Lecturer in Russian*
Audrey Strutt, B.A. Toronto,
Instructor in English*
Sonia Tilson, M.A., DIP.ED. Wales,
Sessional Lecturer in English*
Norman B. Tucker, PH.D. Toronto,
Sessional Lecturer in Engineering*
Barbara Turner, B.SC. London,
Sessional Lecturer in Mathematics*
F. H. Underhill, B.A. Toronto, M.A. Oxford, LL.D. Saskatchewan, Queen's, Toronto, Carleton,
Visiting Professor of Political Science*
Ruth M. Underhill, B.A. Saskatchewan, M.A. Toronto,
Sessional Lecturer in English*
A. R. Wedderspoon, M.A. Cambridge, B.D. Glasgow,
Sessional Lecturer in Classics*
Mary A. Wickens, B.SC. Manitoba,
Demonstrator in Geology*
Phyllis Wilson, B.A. Queen's,
Sessional Lecturer in Journalism*
Julian Wolfe, B.A. Carleton,
Sessional Lecturer in Philosophy*
Linda Wright, B.A. Carleton,
Sessional Lecturer in English*
Bruce Yemen, B.A., B.J. Carleton,
Sessional Lecturer in Journalism*

*Part time

Summary of
Admission Requirements
and Courses

Summary of Courses

	Arts	Journalism	Commerce
Degree	B.A.	B.J.	B.Com.
Divisions in which offered	Day & Evening	First 2 years D & E; last 2 years Day only Also as grad. year	Day & Evening
Length of course[1] from Jr. Matric	4 years	4 years	4 years
Length of course[1] from Sr. Matric	3 years	3 years	3 years
Requirements for admission: to Qualifying Univ. Year	Junior matriculation (Ont. Grade XII or equivalent) in the follow[ing] English, a language other than English; Alg. and Geom.; History; Phy[s.] and Chem., or additional lang.; one of: Music, Art, Geog., Agricult[ural] Science, an additional lang. or Science; with 70% general average. Provi[ded] space is available, the University will consider applicants with a slig[htly] lower average.		
Requirements for admission: to First Year	Senior matriculation (Ont. Gr. XIII or equivalent) in the following: English; a lang. other than English; Math (2 or 3 of Alg., Geom., Trig.) or an additional language; Biol. or Chem. or Physics; one of: Hist., Art, Geog., an additional lang. or Science; with 60% general average. Provided space is available, candidates with a slightly lower average will be considered.	As for Arts	As for Arts, but a modern lang. and all three mathematic[s] are required.
Annual tuition[2]	$515	$515	$515

1. Length shown is that for full-time students; part-time students plan courses over longer periods.

...ce	Engineering	Honours	Graduate Studies
...s	B.Eng.	B.A., B.Sc.	M.A., M.Sc., M.Eng., Ph.D., in certain fields of Arts, Science, and Engineering. Graduate Diploma and M.A. in Public admin. B.J. as post-graduate year. For details, see pp. 66-68.
...& Evening ...ain senior courses ...d day division ...	Day only	Day only	
...rs	5 years	5 years usually	
...rs ...c. in Geology 4 years)	4 years	4 years usually	
		As for Pass Degree	Other
...ish; a lang. other ...English; Alg., ...m., Trig.; 2 of ..., Chem., ...sics; with 60% ...age in Maths. ...60% in Science, ...general average ...or Arts.	English; Alg., Geom., Trig.; Chem.; Physics; History or Geog. or Biol., or a lang. other than English; with 65% average in Mathematics and Science, and general average 60%.	As for Pass Degree, with 1st class standing and approval of Dept. in which Honours studies are to be taken.	Certificate course in Public Service Studies. Special programs of one or more subjects, chosen from those offered in the degree course or in the Extension Department, may be planned to meet the needs of individual students, including those without jun. matric. as well as those with post-grad. degrees.
...5	$575	$515	$95 per course for part-time

The Board of Governors reserves the right to amend its published schedule of fees
...iout notice.

Examinations Equivalent to the Ontario Secondary School Graduation **Diploma**:
The following certificates recognized as equivalent to the Ontario Secondary School Graduation diploma may be accepted in so far as they meet the admission require-ments of Carleton University (see p. 34).

Quebec	Quebec High School Leaving, or McGill Junior Matriculation, or equivalent
Alberta	Junior Matriculation (Grade XI)
British Columbia	Junior Matriculation (Grade XII)
Manitoba	Grade XI
New Brunswick	Junior Matriculation (Grade XII)
Newfoundland	Grade XI
Nova Scotia	Junior Matriculation (Grade XI)
Prince Edward Island	First Class License or Second Year Certificate from Prince of Wales College
Saskatchewan	Grade XI
United States	High School Graduation

Examinations Equivalent to Grade XIII (Canada and Great Britain)
The following certificates recognized as equivalent to the Ontario Grade XIII certif-icate may be accepted in so far as they meet the Senior Matriculation requirements of Carleton University.

Quebec	Quebec Senior High School Leaving Certificate, or McGill Senior Matriculation
Alberta	Senior Matriculation (Grade XII)
British Columbia	Senior Matriculation (Grade XIII)
Manitoba	Senior Matriculation (Grade XII)
New Brunswick	Senior Matriculation (Grade XIII)
Nova Scotia	Senior Matriculation (Grade XII)
Prince Edward Island	Honour Diploma of Third Year, Prince of Wales College
Saskatchewan	Senior Matriculation (Grade XII)
England, N. Ireland, & Wales	The General Certificate of the various English Univer-sities and the Welsh Joint Education Committee with passes in five subjects, two of which must be at the Advanced Level.
Scotland	The Scottish Universities Entrance Board's Certificate of Attestation of Fitness

Courses for those who are not candidates for certificate, diploma, or degree

Subjects in the curricula of the Faculties of Arts, Science, and the School of Public Administration are open to persons who do not wish to study for a certificate, diploma, or degree, provided that they have the required background for those they choose; or provided they enrol in introductory courses for which space is available.

As an extension service, non-credit courses in subjects of cultural and vocational value are open to members of the public. The Committee on Adult Education issues a bulletin describing this program. Copies can be obtained, on request, from the Registrar's Office.

Pre-Professional Courses

Students who plan to undertake further professional training after completion of their studies at Carleton University are invited to consult the Registrar for aid in selection of their courses.

Among the fields for which preparatory courses may be planned at Carleton are: Medicine, Dentistry, Law, Theology, Teaching, Library Science, Social Work, Accountancy.

Fees

The annual composite fee includes tuition, Students' Association, Athletics, and Health Service fees, and where applicable laboratory, graduation, and summer survey camp fees.

Arts, Commerce, Journalism, Science:

Students taking 4 or more subjects	$515.00
Part-time students taking fewer than 4 subjects (per subject)	$ 95.00

Engineering

Full-time students	$575.00

(See Withdrawal and Refund, p. 27).
Included in the above composite fee are the following:

	Part-time per subject	Full-time
Students' Association	1.50	17.50
Athletics	.50	5.50
Health Services	—	2.00
University Union Contribution (as voted by student body)		10.00

Graduate Fee
See Faculty of Graduate Studies, p. 67.

Late Registration Fee
Full-time students:
$10 first week after registration period
$15 second week
Part-time students:
$1 (per course) first week after registration period
$2 (per course) second week

Examination Fees

a) Supplemental and special final examinations, written at Carleton University, per paper	5.00
b) Examinations written at a university centre other than Carleton University, when permitted	10.00

Transcript Fees
All students are entitled to two free transcripts. After these have been issued the fee is $1.00 for the first, 50 cents for the second, and 25 cents for each additional copy at any one time of ordering.

Deferred Payment Fee
Payable when fees are paid in:
a) two instalments
$ .50 per half course (5 courses $5.00)
b) more than two instalments
$1.25 per half course (5 courses $12.50)
Fees may be paid by any of the following plans:
1. Payment in full at the time of registration.
2. Payment in two instalments:
a) At registration—½ of the total tuition, plus Miscellaneous Fees (where applicable), and Deferred Payment Fee (see above).
b) At or before mid-session—the remaining half of the total tuition fee.
3. Payments in five instalments (winter session only):
a) At registration—⅕ of the total tuition, plus Miscellaneous Fees (where applicable), and Deferred Payment Fee (see above).
b) On the 15th of October, November, January, and February—⅕ of the total tuition fee.

Withdrawal and Refund
The composite fee for full-time students is a charge for 4 subjects or more. No charge is made for the 5th or any additional subjects; conversely, no refund will arise as a result of withdrawal from a subject by a full-time student unless the change alters his status from full-time to part-time.

Students who are forced to withdraw from a course, or from the University, are required to notify the Registrar in writing, or fill out the appropriate forms in his office, and to give their reasons for withdrawal. Students who withdraw from the University must return their identity card to the Registrar's office immediately. Refunds will be calculated by the date of receipt of the card.

Credits or refunds will be granted as follows:

a) Cash refunds:

1) Cash refunds will be granted in cases where students are compelled to withdraw on account of serious and continued personal illness.

2) In case a student who is regularly employed during the day is sent out of the city permanently by his employer or compelled so to change his working hours as to prevent his continuing at the University, a refund will be granted.

3) Cash refunds may also be granted in cases where the student is compelled to withdraw for other personal reasons, provided that these reasons are satisfactory to the University authorities.

b) Tuition not refunded or used may, if a certificate of credit is secured from the Bursar, be applied upon subsequent courses pursued in the University, provided such courses are taken within two years of the date of withdrawal of the student.

c) Miscellaneous fees and Deferred Payment fees are not refundable.

d) The portion of the tuition fee refunded is determined by the date of the return of the student identity card with a written notice of withdrawal.

e) No application for withdrawal and refund will be considered if received after February 15 in the winter session (in the case of first term courses, November 15) or after July 31 in the summer session.

Residence
A detailed statement of approximate cost of one year (8 months) at the University will be found on p. 233.

Residence fees, (including $3.00 residence association fee), payable in one or two instalments are:

Single room $703

Double room $678

If paid in two instalments there is an additional deferred payment of $7.00.

Total fee, or the first instalment, is due prior to admittance to residence.

First instalment (in addition to the room deposit) is $350 for a single room, $335 for a double.

The second instalment is due on January 2, and is $335 for a single room and $325 for a double room.

A deposit of $25 must accompany applications and will become applicable to rental charges upon admission to residence. This will be refunded only under the following circumstances:

a) If applicant fails to qualify for admission to Carleton University.

b) If applicant is not allotted a place in residence.

Parking
Permission to park on the campus is granted for a small fee to students and others associated with the university, but this permission is conditional upon co-operation in

the observance of the regulations. Infractions will be penalized, and under certain circumstances cars will be towed away at the owner's expense and risk. In this, as in other respects, examination grades will be withheld from students owing sums of money to the university. Unless cause can be shown, the third infraction will lead to withdrawal of parking privileges. The university accepts no responsibility for cars or their contents parked or operated on the campus. Applications for parking permits and the regulations related thereto are available in the Bursar's office; students and staff who bring cars to the campus are expected to make themselves familiar with these regulations.

General Regulations

Application to Committee on Admission and Studies
Students seeking special consideration under the regulations described in this section should apply to the Registrar who is the executive officer of the Committee on Admission and Studies.

Classification of Students
Students are classified as undergraduate or graduate students if they are properly matriculated for and proceeding to a degree, diploma, or certificate; otherwise they are classified as special students. Full-time students are those enrolled for four or more subjects in an academic session, and part-time students those enrolled for two or less.

Credit for Senior Matriculation Courses
No more than five senior matriculation subjects taken in a secondary school may be counted toward a Carleton degree.
Except by permission of the Committee on Admission and Studies, no student will be given credit for senior matriculation subjects passed in a secondary school system after he has been registered as an undergraduate in Carleton University.

Substitution for Prescribed Language Courses
A student whose mother tongue is not English, and whose previous academic training has not been in English, may apply to the Committee on Admission and Studies for permission to substitute an approved course in the humanities for the prescribed course in a language other than English.

Proficiency in English
All students at the University are required to be proficient in the use of the English language. In any year of his course, a student may be referred by any instructor to the Department of English, which will decide whether he must receive additional tuition.

Course Load
Normal course load for a full-time student in the winter session is five courses. Except in the honours or engineering programs, no more than five full courses may be taken for credit in the winter session, unless by permission of the Committee on Admission and Studies.
All transfers must be made within two weeks following the opening of classes. A student who has been in full-time attendance at the University in a winter session may take a course (or two courses if not otherwise fully employed) in the following summer session if it is recommended by his major department. Students not identified with a major department must consult the Registrar.
Normal course load for a part-time student is one or two courses in each winter session and one course in each summer session. An extra course may be taken in either session with the permission of the Committee on Admission and Studies.
The Committee on Admission and Studies will permit a student to take an extra course for credit only if in the previous academic session he obtained better than average standing.
With the consent of the instructor, an undergraduate student or graduate student enrolled for degree credit may *audit* courses (i.e. attend without the privilege of writing examinations) in addition to those being taken for credit. No charge is made for courses audited, except for special students.

Attendance
A student is expected to attend all lectures, discussion groups, seminars, laboratory periods, and examinations in any courses in which he is registered, whether these are

formally scheduled by the University Registrar or informally announced by the instructor.

Each instructor will inform his classes early in the session of the relation of class attendance to course grades, and whether attendance records shall be kept.

Grading Symbols and Points
Standing in all courses in this University is graded by the letters, A, B, C, D, any of which may be accompanied by "plus" or "minus" modifications; or F (failure). For the purpose of calculating "equivalent standing" at Carleton, point values ranging from 12 to 0 will be assigned to grades ranging from A+ to F.

Additional symbols used to indicate standing are as follows:

Aeg. Aegrotat: absent from final examination, but granted standing on basis of year's work (a student granted aegrotat may write a special examination for a grade in the course). See p. 32 (Special Examinations)

Pass. Passed supplemental examination but not otherwise graded.
(Grade point value = 1.)

Abs. Absent from final examination. (At the discretion of the instructor, a student who is absent from the final examination may be graded "F(ns)": see below.)

F(ns) Failure: no supplemental examination allowed. This is normally given when a student has unsatisfactory laboratory work or unsatisfactory term assignments, or, if his term work is not completed before the first day of final examinations, or if he receives a mark so low in the final examination that the privilege of a supplemental is not justified.

Wdn. Withdrawn in good standing.

Standing
A student's standing in his year's work will be determined not only by the results of mid-year and final examinations, but also by the work of the whole session, including class tests, laboratory work, essays, attendance, progress, and any other matters bearing on the candidate's worth as a student of the University.

The Senate may, at any time, either during the term or after the close of the term, require a student to withdraw from the University if his conduct, attendance, work, or progress is deemed unsatisfactory.

General Regulations for Honours Degrees
A student wishing to enter an honours program must apply to the Chairman of the department of the Honours subject. Admission to honours will be granted only with the consent of the department in which the honours subject is taken and with the approval of the appropriate committee on honours.

Requirements for Honours standing
For entry into the *First year* a student must have at least a 75% average in Senior Matriculation or a grade point average of 7.0 or equivalent standing in the Carleton Qualifying year; together with a grade point of 7.0 or its equivalent in the honours subject if such is offered in the Qualifying year.

To enter or remain in honours at the beginning of the Second and subsequent years a student must have obtained in the First year: a grade point average of at least 6.8 in the honours subject or subjects and 6.0 over all subjects; a grade point of 4.0 or better in at least half the courses taken. He must also meet such other requirements as may be prescribed by the honours department (as specified pp. 72-230).

A student in his final year of a Pass degree who wishes to transfer into the Fourth year of an honours program must apply to the honours department for his name to be withdrawn from the graduation list before March 1 of that year. If this application is not accepted his name will be returned to the graduation list.

A student wishing to improve his grade point average may, with special permission of the honours department, take a supplemental or special supplemental examination, or may repeat a course, provided the total number of such examinations or repeated courses does not exceed three in his entire program beyond Qualifying year.

A student who fails to maintain honours standing must withdraw from honours; he may apply for admission to a pass program.

Combined Honours
A student wishing to enter a combined honours program must satisfy the regulations for combined honours of both departments.

Promotion
To be eligible for promotion to the next year a student must pass at least three courses before supplementals and at least four courses after supplementals, with a minimum grade of C in at least one subject.

A candidate must obtain complete standing in the Qualifying University year before registering in the Second year, and complete standing in the First year before registering in the Third year of any course.

To enter Third year, a student must have at least 'C' or equivalent standing in the courses of his major subject or subjects. He must also comply with additional requirements of his course program.

A student below the required minimum standard at the end of his year prior to graduation may be required to withdraw from his major field by the department.

Requirements for Graduation
Students expecting to graduate in the spring should make application on the appropriate form in the Registrar's office by February 1, and those expecting to graduate in the fall, by September 1.

To qualify for graduation a student must have (1) at least 'C' standing in his major subject or subjects; (2) 'C' standing or better in at least half the courses taken at Carleton; (3) at least 'D' standing in the remainder of the courses counted towards his degree; and (4) the recommendation of his major department and Faculty.

Graduation with Distinction
Students in the pass course who have on graduation a grade point average of at least 9.0 on all courses counted for credit, and who are recommended by their major department, will be designated as graduating *with distinction*.

Failure
A student who has not satisfied the conditions for promotion has failed his year. A student who has failed his year will retain credit only for those courses in which he obtained 'C' or higher standing, and must repeat the other courses of that year. (For regulations governing failure in Engineering, see p. 61.)

Probation
A student who has failed his year at Carleton University or elsewhere may apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year and must pass all courses taken (at regular or at supplemental examinations if allowed) in order to be restored to good standing. A student on probation who fails a course

(including its supplemental examination if allowed) will be considered to have failed his year, and normally will forfeit his undergraduate status. A part-time student placed on probation must pass five courses in succession at Carleton in order to regain good standing. Students must in all cases meet the terms of probation assigned by the Committee on Admission and Studies.

Forfeiture of Status
An undergraduate who has failed his year twice forfeits his undergraduate status.

Withdrawal
Students who wish to withdraw from courses must apply in writing to the Registrar or fill out the appropriate forms in his office.

A student may not withdraw in *good standing* from any course for which he is registered, after February 15 in the winter session (November 15 in the case of half courses in the first term) or July 31 in the summer session, except by permission of the Committee on Admission and Studies. If the student should withdraw from a course without such permission and fail to write the final examination, his record will show that he was absent from the examination and he shall not have the privilege of writing a supplemental examination in that subject.

Examinations
Mid-year examinations are held in all Qualifying University year and First year courses and in other courses at the discretion of the instructor, and *final* examinations are held in all courses, at the times listed under the Academic Year, p. 1. A single, joint *final* examination is set for day and evening classes in each course, usually during morning and afternoon hours. In courses in which no formal mid-year examinations are held, mid-year grades will be given when possible on the basis of assignments, tests, and other term work during the first term.

A student who is absent from a university examination scheduled by the Registrar's Office, will receive no credit in the course. Exceptions to this rule may be made for certified medical disability, or for other good cause acceptable to the Committee on Admission and Studies.

Special Examinations
A student may not be able to write the scheduled mid-year or final examination in a course because of illness. He may apply for aegrotat standing or for permission to write a special examination provided he presents the appropriate (University) medical certificate to the Committee on Admission and Studies. This certificate requires a statement by his attending physician that he was ill at the time of the examination. Students actually under medical treatment in the period immediately prior to the examinations are reminded that it is their responsibility to notify the University that this situation exists if it will affect their attendance at the examination.

Reasons other than medical must also be fully documented for consideration by the Committee.

A student whose reason for missing the final examination has been accepted by the Committee may be required, or may apply for permission, to take a special *final* examination. Special final examinations, and arrangements for taking them, may be authorized only by the Committee on Admission and Studies. These examinations are written at the time of the supplemental examinations.

Applications for aegrotat standing, or for permission to write special examinations, must be submitted in writing to the Committee on Admission and Studies through the Registrar. The reason for missing the regular examination must be stated and confirmed by documents. The application must be made not later than one week after the date of the examination.

Supplemental Examinations

To be eligible for supplemental privileges a full-time student must have passed at least three courses.

All supplemental examinations in courses during the winter session are held in August, at the University, with the exception of supplemental examinations for January half-course finals—these are held in May. Summer course supplemental examinations are written in November. For exact dates, see the Academic Year, p. 1. Fees are shown on p. 26.

An undergraduate student who has been graded 'F' on a final examination, but has not failed his year, may write a supplemental examination in that subject at the time of the next regular supplemental examinations. In such cases, the supplemental examination ordinarily will be graded only "Pass" or "Failure".

The privilege of writing supplemental examinations will be denied where students have been graded "F(ns)" (see p. 30); such students shall, however, have the right of appeal to the Committee on Admission and Studies. Special regulations govern Honours, Engineering, and Graduate Studies.

No student may write supplemental (including special supplemental) examinations in more than two courses or the equivalent in half-courses in any year.

Special Supplemental Examinations

A student wishing to raise a grade in a course already passed may apply to the Committee for permission to write a special supplemental examination. (A special supplemental examination is the same as an ordinary supplemental examination except that it is graded.)

Not more than three special supplemental examinations may be taken in a student's degree program.

A student who is granted permission to rewrite a subject for higher standing may do so once only, at the next regularly scheduled examination period. Students are advised that when they write special supplemental examinations for the purpose of raising their standing, the final grade assigned in any subject will be based on the whole year's work, including the supplemental; that the grade so obtained shall be the grade of the special examination including term work if appropriate.

If a supplemental examination is failed, the student will be required to repeat the course before writing an examination in that course in any subsequent year.

Release of Grades

Official course grades are released only by the Registrar. Year-end reports are mailed to students as soon as possible after the release of grades has been authorized. Upon the request of a student, a duplicate of his report will be sent to his employer or another designated person.

Library Regulations

All persons taking courses in the University, and all graduates of the University, are entitled to use the library the year round. Library hours are listed on the inside back cover.

Most books may be borrowed for two weeks. Some books are placed on "Reserve" and may be borrowed overnight, for three days, or for one week. If books are not returned when due, fines are charged.

Reference books may not be taken from the library.

Every undergraduate entering the Qualifying University or First year in the day division will be required to complete satisfactorily an exercise in the use of the library, including card catalogue, bibliographical sources, and standard reference works.

Faculty of Arts

Dean of the Faculty: David M. L. Farr, M.A., D.PHIL.

Division I: Director, D. M. L. Farr.

Classics	History	Psychology
English	Italian	Religion
Fine Arts	Journalism	Russian
French	Philosophy	Spanish
German		

Division II: Director, John Porter, B.SC. (ECON.)

Accounting	Political Science
Economics	Public Law
Geography	Sociology

Admission Requirements

To the Qualifying University year of courses leading to the Bachelor of Arts degree:
a) Junior Matriculation—the Ontario Secondary School Graduation Diploma in the General Course (Grade XII), or an equivalent certificate, with a general percentage of at least 70%. Providing space is available, the University will consider applicants with a slightly lower average.

Standing is required in the following subjects:
1. English.
2. Mathematics (Algebra and Geometry).
3. History.
4. A language other than English.
5. Science (Physics and Chemistry; or Agricultural Science, Parts I and II) or an additional language.
6. Any *one* of: Music, Art, Geography, Agricultural Science, an additional language, or an additional science.
b) Mature Matriculation—A person over the age of twenty-three years who, though lacking the admission requirements specified above, can give evidence of the likelihood of success in university studies, may be admitted on probation. If he completes successfully the subjects of the Qualifying University year, his matriculation will be confirmed and he will be given credit for the year. Persons interested should consult the Registrar.
This provision applies to persons wishing to study full-time. Others can test their capability through taking courses as special students in the evening division.

To the First year of courses leading to the Bachelor of Arts degree:
a) Completion of the Qualifying University year, *or*
b) Attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII), or an equivalent certificate, with a 60% general average. Applicants with a slightly lower average may be admitted if they can satisfy the University that they have a reasonable chance of success. Standing is required in the following subjects:
1. English Composition and Literature.
2. A language other than English.
3. Mathematics (2 or 3 of Algebra, Geometry, Trigonometry) or an additional language. For students intending to major in Economics or Psychology, standing in Algebra and Trigonometry is required.
4. A science: Biology (Botany and Zoology) or Chemistry or Physics.
5. One of: History, Geography, or Art, or an additional language, or an additional science.

To the Second or subsequent years of courses leading to the Bachelor of Arts degree: Applications for admission to the Second or subsequent years will be evaluated on their merits, and advanced standing will be granted for studies undertaken elsewhere only when these are recognized as the equivalent of courses offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

Bachelor of Arts—(Offered in both day and evening divisions).

Length of course. Candidates for the Pass B.A. degree will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. See also Course Load, p. 29.

Course selection. The B.A. course is designed to provide opportunity for a liberal education, including specialization in one subject of study, called a major. A *combined major* in two subjects may be taken, with the consent of the departments concerned. Students majoring in a single subject will take from five to seven courses in that subject, depending upon departmental requirements, while students electing a combined major will take four or five courses in each subject of the major.

The choice of a major will normally be made upon entry to the Second year, in consultation with the department or departments concerned. A student who has not chosen a major at this point will be required to obtain approval for his courses from the Faculty adviser to undeclared majors. A change in major may be made only with the approval of both the deparments concerned.

Subjects for majors and combined majors are as follows:

Classics (Latin, Greek), Economics, English, French, German, Geography, History, Mathematics, Philosophy, Political Science, Psychology, Religion, Russian, Sociology, Spanish. (In certain cases, and with consent of the Department of Biology, a major in Biology in the B.A. course may be taken.)

Courses will be selected from those listed under Details of Subjects, p. 72, as follows:

Qualifying University Year

1. English 10.
2. A language other than English (a course numbered between 10 and 99).
3. Mathematics 16* and 36* or one of French 10, German 15, Greek 15, Latin 10, Russian 15, Spanish 15. For students intending to major in Economics, or Psychology, standing in Algebra and Trigonometry is required.
4. A science: Biology 100 or Chemistry 10 or Physics 10 or Geology 100 or Science 100.
5. History 10, or another language, or an additional science.

First Year

Either one or two of the requirements specified below may be *deferred* until the following year, to permit substitution in the First year of an additional course or courses chosen from Groups 2, 3 or 4, or Religion 100 or 120. (Pre-medical students are referred to p. 77.)

1. A course in English literature: English 100, 101, or 165. (Students choosing English as a major will take English 165.)
2. An introduction to the problems of thought and conduct: Philosophy 100, or Humanities 100. Philosophy 100 is a prerequisite for all other courses in Philosophy except 300 and 310.

*An asterisk attached to a course number indicates a half course; see p. 72.

3. An introduction to the study of society: one of Economics 100, History 100 or 115, Political Science 100, Psychology 100, Sociology 100.

4. A continuing language other than English: one of French, German, Greek, Italian, Latin, Russian, Spanish (a course numbered in the 100's. Note that except in French and Latin, this may require a prerequisite course numbered 15, which will carry a credit.)

5. Either: Mathematics 130 or 100 or 101 (Mathematics 101 is a requirement for students whose major department is Economics or Psychology.)

or: A science course chosen from Science 100, Biology 100, Chemistry 10 or 100, Geology 100, Earth Science 100 or Physics 10 or 100.

Second and Third Years

A total of ten courses, five in each year: a minimum of four of these to be in the student's major (five, if one is not taken in First year.) The others are to be chosen with the approval of the major departments.

Summer Reading Requirements

Students taking the course program leading to the B.A. are expected to fulfil summer reading requirements as announced, and should inform themselves of the requirements specified by each major department. The degree will not be conferred upon students failing to meet this obligation.

Bachelor of Arts with Honours

The degree of Bachelor of Arts with Honours is designed for students who wish more rigorous and extensive studies in their chosen discipline. The honours degree is essential as a qualification in certain fields of employment and is the essential or most desirable preparation for those intending to pursue graduate studies or professional training. The programs of studies in honours are carefully prescribed and are given close supervision by the chairman of the department responsible for the major subject or field of study. The student in honours must show competence in independent work and in small groups. Opportunity is provided for the student to read widely beyond as well as within his particular field of honours study.

Additional Admission Requirements. Admission to Honours will be granted only with the consent of the department in which the major subject is taken and with the approval of the Committee on Honours.

Students with at least a 75% average in Senior matriculation or equivalent or seven grade point standing in the Carleton Qualifying University year, and seven grade points or better in the Honours subject, may be enrolled in Honours in the First year. Such students may take six courses as prescribed under the separate Divisions below.

Length of Course. Candidates for a degree with Honours will ordinarily take twenty-five courses in five years if admitted by Junior matriculation, or twenty courses in four years if admitted by Senior matriculation. With the permission of the department or departments concerned, it is possible for a candidate of exceptional ability to complete an Honours program in certain fields in three years from Senior matriculation by taking six courses in each winter session and one in each of the summers (if necessary, completing a graduation essay or thesis where required in the summer of the graduating year).

Course Selection. A candidate for Honours must choose a major subject or an approved combination of subjects, normally before entry to the Second year. Details of Honours courses may be found below under the respective departmental programs.

Students wishing to qualify for entry to the Ontario College of Education in the course leading to the High School Assistant's Certificate Type A should consult the Registrar and the appropriate department regarding course selection.

Programs of Study

1) Honours Programs in the Humanities

At present Honours are available in Classics, English, French, German, Russian, Spanish, Mathematics, and Philosophy. Certain programs of combined Honours may be arranged by permission of the departments concerned.

The First year Honours prescription consists of the present First year of the Pass Arts course, with the option of a sixth course to be chosen in consultation with the department concerned.

2) Honours Programs in the Social Sciences

At present Honours are available in Economics, Geography, History, Mathematics, Political Science, Psychology, Public Administration, and Sociology. Combined honours programs are also available.

The course pattern for entrance into First year Honours in the Social Sciences is as follows:

4 of: Economics 100
      Geography 230
      History 115
      Political Science 100
      Psychology 100
      Sociology 100

1 of: English 100   both to be taken
      Philosophy 100   before graduation

1 of: A First year language course   two to be taken
      A First year science course   before graduation
      A First year mathematics course

3) Honours Program in Canadian Studies (this is fully described on p. 40).

4) Honours Program in Soviet and East European studies (this is fully described on p. 51).

Commerce

Bachelor of Commerce (Offered in both day and evening divisions)
The course leading to the degree of Bachelor of Commerce is designed primarily to provide an education with some concentration in economics, and an introduction to those subjects likely to be of particular interest to students contemplating a business career. Because the aims of students differ widely, and because specific training can be gained more effectively in business itself than in academic courses, the Commerce course contains no specialized training in the techniques of business management and administration.

Honours in Commerce (Four Years)
Students wishing to proceed to an honours degree are invited to see the Chairman of the Commerce Committee.

Admission Requirements
Requirements are the same as those for admission to the equivalent years of courses leading to the Bachelor of Arts degree (see p. 34) but candidates entering with Senior matriculation must have standing in Mathematics (Algebra, Geometry, Trigonometry).

To the Second and Third years of the course leading to the Bachelor of Commerce degree:
Applications for admission to the Second or Third years will be evaluated on their merits, and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University.

Course Requirements
Length of course. Candidates for the Bachelor of Commerce degree must take a total of 20 courses after Junior Matriculation or 15 after Senior Matriculation. See also Course Load, p. 29.
Course selection. Courses will be selected from those listed under Details of Subjects, p. 72ff., as follows:

Qualifying University Year
1. English 10
2. French 10 or a course numbered between 10 and 99 in another modern language[1]
3. Mathematics 16* and 36*
4. A science: Chemistry 10, Physics 10, Geology 100, or Science 100
5. History 10

First Year
1. English 100 or 101, or Humanities 100, or Philosophy 100
English 100 or 101 and one of the other two must be taken before graduation.
2. Mathematics 101
3. Economics 100
4. Accounting 100[2]
5. A Social Science other than Economics, or a course in the Faculty of Science, or a language other than English; as specified in First year Arts requirements p. 34.

[1]See also p. 29, Substitution for Prescribed Subjects.
[2]With the permission of the Chairman of the Committee on Commerce Studies, students may postpone Accounting 100 until Second year and Accounting 200 until Third year in order to substitute an approved course.

Second Year
1. Economics 200
2. Economics 210
3. Economics 220
4. Accounting 200[2]
5. Any other course approved by a member of the Committee on Commerce Studies.

Third Year
Five courses chosen as follows:
1. Economics 225 or Economics 325
2. At least one Economics course in category 4 of the Economics program (p. 95).
3. Remaining courses to be approved by a member of the Committee on Commerce Studies.[3]

Commerce students wishing to discuss their programs of studies should consult the Chairman of the Committee on Commerce Studies, who is their faculty adviser.

Students who, after achieving the B.Com. degree, intend to proceed to professional accounting degrees—Chartered Accountant (C.A.), Certified General Accountant (C.G.A.), or Registered Industrial and Cost Accountant (R.I.A.)—should consult Professors Caterina or Scott before entering the final year of the Commerce course. Any other students who are interested in professional accounting careers are referred to the special circular covering the various accounting degree-granting bodies.

Standing. Students will not normally be permitted to enter the Second year of the Commerce program unless they have obtained a grade of 'C' or better in each of Economics 100 and Accounting 100.

Students who have failed to achieve this standard and wish to continue in Commerce should consult the Chairman of the Committee on Commerce Studies immediately upon receiving their results.

General regulations regarding standing are stated on p. 30. For purposes of the Commerce course, these regulations are to be interpreted as follows:

(i) A candidate for the B.Com. degree must obtain a grade of 'C' or better in at least half of the courses taken at Carleton University for the degree.
(ii) He must obtain a grade of 'C' or equivalent in any six of his Economics and Accounting courses.
(iii) He must obtain a grade of 'C' or equivalent in any four such courses before being admitted into Third Year Commerce.
In addition, candidates must be recommended for graduation by the Committee on Commerce Studies.

[2]With the permission of the Chairman of the Committee on Commerce Studies, students may postpone Accounting 100 until Second year and Accounting 200 until Third year in order to substitute an approved course.
[3]In addition to courses continuing from those taken in earlier years, students may wish to consider Public Law 251 (Commercial Law) or Public Law 350, or 451 (Company Law).

The Institute of Canadian Studies

Director: Marcel Trudel, L. ès L., D. ès L.
Co-Director: Stanley R. Mealing, M.A., B.LITT.

Committee of Management
Davidson Dunton, President of the University
David M. L. Farr, Dean, Faculty of Arts
W. T. Bedwell (English)
Wilfrid Eggleston (Journalism)
Gilles Paquet (Economics)
K. Z. Paltiel (Political Science)
Gordon C. Merrill (Geography)
John Porter (Sociology)
James S. Tassie (French)
Robert L. McDougall (on leave of absence 1965-66)

Visiting Fellows:
1962-3: Professor Mason Wade, Director of the Canadian Studies
Program, University of Rochester.
1963-4: Hon. M. J. Coldwell, former national leader, the C.C.F. Party of Canada.
1964-5: Professor S. F. Wise, Department of History, Queen's University, Kingston.

Through the medium of the Institute, eight departments in the humanities and social sciences co-operate to offer honours and graduate programs in Canadian Studies and to support a wide range of related activities which include the editorial supervision of the *Carleton Library* series of paperback publications, and the sponsorship of the "Living Tradition" series of public lectures. The emphasis in both of the academic programs of the Institute is interdisciplinary, the principle of concentration being sought less in the study of a single university subject than in the study of a selected area from a broadly humanistic point of view. Both programs, on the other hand, allow the student to establish a firm base in a discipline of his choice. The skills and attitudes of particular disciplines are therefore respected; they are brought, wherever possible, into a relationship in which one set of skills and attitudes supports and extends the range of another. This context is further widened by the provision of a comparative dimension to Canadian Studies. At the graduate level especially, students are encouraged to see certain aspects of the cultural history of Canada in relation to corresponding aspects of the cultural history of countries with which Canada has had traditional ties: Great Britain, France, the United States, Australia. The proximity of Carleton University to the National Library, the Library of Parliament, the Public Archives of Canada, the Dominion Bureau of Statistics, and the libraries of government departments and embassies ensures excellent facilities for research in the fields of study with which the Institute is concerned.

Undergraduate Program
Students may elect an honours program in Canadian Studies. The first two years of the program will provide the foundations for an area concentration in the third and fourth years. All programs must be approved by the Institute's Committee of Management.
In Year I and Year II, in addition to completing the standard requirements for a first-year language course (in this case French) and a first-year science or mathematics course, students will take the following: English 100 or 165; History 100 or 115; Philosophy 100 or Humanities 100; and two of Political Science 100, Sociology 100, Economics 100.
In Year III and Year IV, students will take six of the following: English 392; French 330; Economics 325 or 340; Geography 215; History 230 or 430 or 443; Political

40

Science 300 or 400 or 405 or 450; Sociology 320. A graduating essay, interdisciplinary in nature, will also be required and will carry the weight of a further course.
Four of the six remaining courses required will be taken in the second, third, and fourth years in a subject of specialization chosen from the humanities and social sciences.

Graduate Program
General regulations governing admission to studies for the Master of Arts degree (see page 66) will apply. Candidates for the M.A. degree in the Institute will choose, in consultation with the Director, three courses from the list which follows. A thesis and oral or written examinations on selected fields complete the requirements for the degree. Candidates may elect two additional courses in lieu of a thesis. Applicants should note that they may also be required to undertake preliminary work in fields which they may wish to enter at the graduate level but in which they have had little or no undergraduate training. The meeting of these extra requirements may make necessary a two-year program. A reading knowledge of French is a prerequisite for admission.

Course List
(For descriptions of subject courses, students should consult calendar entries under individual departments.)

Interdisciplinary Seminar (Canadian Studies 500):
(Not offered in 1965-66.)

Directed Research (Canadian Studies 590)

Canada since 1867 (History 533)
British North America, 1783-1867 (History 530)
Selected Problems in Canadian History (History 430)
Canada-United States Relations (History 443)
The British Commonwealth of Nations (History 473)
Canadian Poetry (English 555)
The Canadian Novel (English 556)
Comparative Literary Studies: Canada and the United States (English 575)
Comparative Literary Studies: Canada and Australia (English 576)
Le roman canadien de langue française (French 520)
La poesie canadienne de langue française (French 521)
Provincial and Municipal Government (Political Science 500)
The Political Process in Canada (Political Science 510)
The Canadian and American Traditions (Political Science 535)
Canada in World Affairs (Political Science 560)
Government of Canada (Political Science 400)
Canadian Federalism (Political Science 405)
Constitutional Law (Political Science 450)
The Economic Development of Canada (Economics 325)
Canadian Society (Sociology 525)
North America (Geography 215)
The Press in Canadian Society (Journalism 410)

Note:
Not all courses listed are offered in any given year; not all combinations of courses are possible. Students will plan their programs in consultation with the Director.

Carleton's Institute and the Institute of Commonwealth and Comparative Studies at Queen's University, Kingston, co-operate in the related fields of Canadian and Commonwealth Studies. Graduate students in the Institute of Canadian Studies program may be attached, between terms or for a summer session, to the Institute at Queen's, where they will be offered facilities for study and access to the special Canadian and Commonwealth collections of the Queen's University library. Students in the Institute of Commonwealth and Comparative Studies may similarly be attached for short periods of time to the Institute of Canadian Studies at Carleton.

Forms for admission to graduate studies may be obtained from the Dean, Faculty of Graduate Studies. Completed applications should be sent to the Director of the Institute of Canadian Studies. The closing date for applications for University Fellowships (see page 249) is March 1.

Journalism

Director of the School: Wilfrid Eggleston, M.B.E., B.A., F.A.G.S.

Bachelor of Journalism (First two years offered in both day and evening divisions; last two years offered in day division only).

The place of the journalist in society has been profoundly affected by the events of recent decades. The revolution in communication and transportation has enormously extended the reach of every community. The rise in literacy and the extension of democratic government has greatly increased the potential audience. The increasing complexity of life demands a more sophisticated approach to reporting and editing. More 'depth' reporting, more explanation, and more interpretation are required. The new media enrich the possibilities for vivid and effective reporting. All these changes emphasize the rising importance of the reporter, who must serve as "eyes and ears of the world".

The new age of technology needs technicians and technologists to serve it. Without them the reporter and editor will be ineffective. But the primary task of the journalist is another matter. What is wanted today is the skilled investigator, the intelligent interpreter, and the able communicator, in any medium. The world of journalism needs a constant flow of honest and alert young people with wide interests and a zest to find out what is going on in the world. These young people require a first-rate education, coupled with sufficient training in the primary skills to enable them to move easily and effectively into the various regions of modern journalism.

For these reasons the courses in Journalism at Carleton University emphasize liberal scholarship and basic skills. We assume that there are few practical applications of a specialized nature which cannot be subsequently acquired in a few weeks of actual work. While an array of "shop" courses in practical vocational training might appear to give more immediately useful crafts to the prospective journalist, it is contended that no amount of "shop" training will carry a "cub" far if he lacks a broad background of liberal education and the intelligence to grasp and report the complex phenomena of modern society.

The opportunities in the national capital for the training of newspapermen and women are exceptional. The members of the parliamentary press gallery and staffs of the Ottawa newspapers, the press attachés of diplomatic missions, top executives in the field of broadcasting, the public relations officers of government departments, and headquarters personnel of national associations are among the resources from which Carleton University can draw for guest lecturers and teaching material. Ottawa is a repository and bureau of information upon almost every conceivable national and international topic. Residence for two or three years in the national capital can of itself be an education to anyone who plans to make journalism his or her career.

Admission Requirements

a) To the Qualifying University year of the course leading to the Bachelor of Journalism degree:

Requirements are the same as those for admission to the Qualifying University year of courses leading to the Bachelor of Arts degree (see p. 34, Calendar).

b) To the First year of the course leading to the Bachelor of Journalism degree:

Completion of Qualifying University year; or attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII) or an equivalent certificate with a 60% general average. Applicants with a slightly lower average may be admitted if they can satisfy the University that they have a reasonable chance of success. Standing is required in the following five subjects:

1. English Composition and Literature.
2. A language other than English.
3. Mathematics (2 or 3 of Algebra, Geometry, Trigonometry) or an additional language.
4. A science: Biology (Botany and Zoology) or Chemistry or Physics.
5. One other, preferably History.

See also p. 29, Credit for Senior Matriculation Subjects.

c) To the Second and Third years of the course leading to the Bachelor of Journalism degree:

Undergraduates applying for admission to advanced standing with allowances on credits gained at their original college or university may be admitted to the Second or Third year, if their academic record is accepted as at least equivalent to the completion of the two previous years of Journalism in Carleton University. Normally, such applicants should offer standing in at least two of the following subjects in their previous work: Canadian History, Psychology, Economics, Political Science. Credit for courses previously taken will be arranged on application, subject to the stipulation that a minimum of a full year's work of at least the last five courses must be taken at Carleton University in order to qualify for the Bachelor of Journalism degree.

Note: Journalism students are urged to become reasonably proficient on the typewriter as soon as possible. All assignments in the professional journalism courses will be done by typewriter.

Course Requirements

Length of Course. Candidates for the Bachelor of Journalism degree must take a total of twenty courses in four years if admitted by Junior Matriculation, or fifteen courses in three years if admitted by Senior Matriculation.

Course Selection. The course leading to the degree of Bachelor of Journalism will consist of subjects selected from those listed under Details of Subjects, as follows:

Qualifying University Year

1. English 10 (English Literature and Composition).
2. French 10 (Readings in Modern French).
or a course numbered between 10 and 99 in another language.
3. Two or three of Mathematics 15*, 25*, 35*.
or Latin 10, or another approved language course.
4. A science: Biology 100 or Chemistry 10 or Physics 10 or Geology 100 or Science 100.
5. History 10 (Main Directions in Modern History).

First Year

1. English 100 (English Authors from Chaucer to T. S. Eliot) or 101.
2. A further course in the language taken in Qualifying Year or in grade XIII.
3. An approved course in History.

4. Philosophy 100 (Introduction to Philosophy) or Humanities 100—one of which must be taken in Second year if not in First; or Psychology 100 (Introductory Psychology).

5. Economics 100 (Principles of Economics) or Political Science 100 (Introduction to Political Science) or Sociology 100.

Second Year
1. Journalism 210 (Introduction to Journalism).
2. Journalism 220 (Fundamentals of Reporting).
3. An approved course in Canadian History; normally History 231.[1]
4. An approved option.[2]
5. An approved option.[2]

Third Year
1. Journalism 330 (Editing).
2. Journalism 340 (Interpretative Reporting).
3. Journalism 350 (Career Seminar in Journalism).
4. An approved option.[2]
5. An approved option.[2]

Standing.
A candidate for the B.J. degree must have at least 'C' or equivalent standing in his Journalism courses, and be recommended for graduation by the School of Journalism. If after the regular examinations in any year a student is below that standard, he is advised to raise his grades in some subjects by writing special supplemental examinations.

Graduate Division
The holder of a Bachelor's or Master's degree in Arts, Science, or Commerce may be permitted to enroll in the Graduate Division of the School of Journalism and, if his or her background has reached the required standard, may qualify for the degree of Bachelor of Journalism in one academic year of five courses. If the background is insufficient in the social sciences or humanities, one or more additional credits may be required for the degree.

The one-year program will normally consist of the following five subjects:
1. Journalism 410 (The Press in Modern Society).
2. Journalism 430 (Editorial Practice and Policy).
3. Journalism 440 (Reporting and Interpreting the News).
4. Journalism 460 (Public Issues and Problems).
5. An approved option from the Social Sciences or Humanities.

Students in the Graduate Division may take part in the workshop sessions in Journalism 350. Arrangements will be made for apprenticeship assignments to supplement such practical experience as graduate students may already possess. Please note the reference above to proficiency in typewriting, and the paragraph relating to standing and grades. A grade of 'C' or higher must be obtained in each of the five courses required in the one-year program for graduates.

[1]A student who proposes to practise journalism in another country may be advised to choose a different History course.
[2]The subjects which will be recommended to students for their choice of options include: Political Science, Economics, Sociology, Philosophy, Canadian Geography, History, English, Social Psychology, French.

Public Administration

Director of the School:
R. Oliver MacFarlane, M.A., PH.D.

The Program
The rapid growth in government services during the last half century has increased the responsibilities and complicated the problems of public employees. The realization has been growing, therefore, that public administrators, whether federal, provincial, or municipal, can profit from a special type of education. Carleton University has been attempting to meet this need by offering programs of study as preparation for public administration.

Assisted by a $200,000 grant from The Atkinson Charitable Foundation, the School of Public Administration was established September 1, 1953, to co-ordinate the various programs of study and to promote further development and research in the field. Four programs are now offered: the first leads to a Bachelor of Arts with Honours in Public Administration; the second to an undergraduate Certificate in Public Service Studies; the third to a graduate Diploma in Public Administration; and the fourth to the degree of Master of Arts in Public Administration.

The Honours B.A. program is planned on the assumption that the most suitable education for a person desiring to be a capable public administrator is broad and general in base, with specialization at a later stage. While it is designed to be of particular use to students contemplating careers in public employment, it also provides a sound general education for those considering the legal profession or business.

The Certificate and Diploma programs, on the other hand, will be most helpful to those who desire training in fields directly related to public administration. The Certificate course is designed to encourage public servants without university training to broaden their background. Since they are allowed degree credit for this work, they will also be encouraged, upon its completion, to continue toward a bachelor's degree. The graduate Diploma course, requiring more advanced studies, is available both to public servants in the evening division and to full-time day students. The M.A. program is offered to full-time students, but may be taken by part-time students, subject to conditions set forth on p. 49. Several scholarships are available for M.A. candidates, and for both full- and part-time candidates enrolling for the graduate Diploma, and for full-time study toward the Certificate.

Public employees not interested in registering for studies leading to a degree, a certificate, or a diploma should note that they may take, as *special* students, any of the subjects listed in Public Administration programs for which they have the requisite background. Their attention is directed also to non-credit extension courses related

to Public Administration which are offered from time to time by the University. Details may be obtained from the Office of the Registrar.

As Carleton University is located in the capital city and enjoys close relations with many government agencies, students of public administration may profit greatly from the unique advantages thus offered. Such institutions as the Library of Parliament, the Public Archives, the Dominion Bureau of Statistics, and the specialized libraries of the several government departments, all offer unusual opportunities for study in Ottawa. Advice and assistance are obtained from the Civil Service Commission and from officials of other government departments and agencies. Experienced public administrators give lectures or lead seminar discussions from time to time.

Undergraduate Courses
Bachelor of Arts with Honours in Public Administration (Qualifying and First years offered in both day and evening divisions; last three years offered in day division only.)

Course Requirements
Candidates for the degree of Bachelor of Arts with Honours in Public Administration must satisfy all requirements for the degree of B.A. with Honours.

Course Selection. The work of this course involves prescribed studies in Political Science, History, Economics, and Public Law, and in approved options, as outlined below.

First Year
Students intending to enter Honours Public Administration in the Second year will take the Honours First year in the Social Sciences (see p. 37), or they may enter from the Pass Course if at least second class standing has been obtained. They are advised, however, to include Political Science 100 (Introduction to Political Science) in the First year, and by the end of that year should have a reading knowledge of French.

Second Year
1. Political Science 210, 310 or 220
2. Economics 100 (Principles) or, if already taken, an option
3. History 230 (Canada from 1791)
4. Political Science 230 (History of Political Thought)
5. An approved option

Third Year
1. Political Science 340 (Problems in Public Administration)
2. Political Science 300 (Canadian Government and Politics)
or Public Law 450 (Constitutional Law)
3. Public Law 350 (Elements) or Political Science 380
4. Economics 210 (Monetary Theory)
or Economics 225 (Economic History)
or Economics 325 (Economic Development of Canada)
or Economics 220 (Statistics)
5. An approved option

Fourth Year
1. Political Science 430 (Modern Political Thought)
2. Political Science 400 (Government of Canada)
3. Political Science 490 (Research Tutorial)
or Political Science 498 (Honours Graduation Essay)

4. Economics 440 (Public Finance)
or Psychology 340 (Personnel Psychology)
or Sociology 350 (Political Behaviour)
or Sociology 245 (Sociology of Work)
or Sociology 345 (Sociology of Power and Stratification)
5. An approved option.

Certificate in Public Service Studies (offered in both day and evening divisions).
This course is designed primarily for public employees who seek special training in
public service subjects at the undergraduate level. Subjects taken for the Certificate
may be credited toward a bachelor's degree, but a student must complete at least five
of the subjects required for the degree after the award of the Certificate. Candidates
for the Certificate, full-time, are invited to inquire about possible financial aid.

Admission Requirements
Junior matriculation (see p. 34); but the cases of experienced applicants without
junior matriculation will be considered on their merits and the completion of certain
subjects at Carleton may be required before admission. Candidates may be admitted
with advanced standing, but must complete at least five courses for the Certificate in
Carleton University.

Course Requirements
The following courses are required and the following order is suggested.
1. Political Science 100 (Introduction to Political Science)
2. Economics 100 (Principles of Economics)
3. History 230 (Canada from 1791)
or History 231 (History of Canada)
or History 325 (The Economic Development of Canada)
4. Political Science 340 (Problems in Public Administration)
5. Political Science 300 (Canadian Government and Politics)
or Public Law 350 (Elements of Public Law)
6. One other, chosen in consultation with the Director according to the needs of the
student.
Standing. A candidate for the Certificate must obtain a grade of 'C' or better in at
least half of the courses taken in Carleton University for the Certificate.

Discontinued Programs:
Bachelor of Public Administration
Bachelor of Arts with Certificate in Public Administration.

Graduate Courses
Graduate Diploma in Public Administration (Offered in both day and evening
divisions)

This course is designed for those in or planning to enter the public service who
already have a university degree, but desire further training in the fields directly
related to public administration.
Admission Requirements
A. A bachelor's degree from a recognized college or university, including (with better
than average standing) the following undergraduate courses, or their equivalents:
a. Political Science 100 (Introduction to Political Science)
b. Economics 100 (Principles of Economics)
c. History 230 or 325 (Canadian History)
d. Two other courses approved by the Director, in the social sciences or related
fields. Experience in public service may be accepted in lieu of one of these two
courses.

An applicant who lacks one or more of these prerequisite courses may be allowed to take one as No. 5 of the course requirements, and may make up the remainder of his deficiencies at the University. Ordinarily he would not be required to take more than two courses in addition to the requirements for the Diploma. A prospective full-time student with only one or two prerequisites to make up may be permitted to take one as an additional course during his full-time year;
or
B. A bachelor's degree in any honours course requiring four years from senior matriculation, or a bachelor's degree and an additional year of post-graduate work with better than average standing. Students who have not obtained standing in Political Science 100, Economics 100 and History 230, 231, or 325 or their equivalents, may be required to take one of these in addition to the requirements for the Diploma.

Course Requirements
Five courses are required:
1. Political Science 340 (Problems in Public Administration)
2. Political Science 230 or 430 (Political Thought)
3. Political Science 400 (Government of Canada)
or Political Science 300 (Canadian Government and Politics)
4. Public Law 350 (Elements)
or Public Law 450 (Constitutional)
or Economics 440 (Public Finance)
or Economics 450 (Economic Fluctuations and Stabilization Policy)
5. An approved social science, preferably chosen from: Economics 220, 430, 440, 450, Public Law 350, 450, 550, Sociology 345, 350, 440, Psychology 340, Accounting 340, or the courses in Political Science.
At least one of the courses for the Diploma must be a seminar.
All five courses for the Diploma must be taken at the University. If a student has already taken any of these courses (or their equivalents) in qualifying for admission to the Diploma program, he must substitute others approved by the Director. To meet the needs of foreign students, variations from the course requirements may be approved by the Director.
Potential Municipal Administrators should elect the following program:
1. Political Science 340 (Administration)
2. Political Science 230 or 430 (Theory)
3. Political Science 490 (Tutorial in Local Government)
or Political Science 498 (Research Essay)
4. Political Science 500 (Provincial and Municipal)
5. Public Law 350 (Elements)
or Geography 420 (Urban).
Standing. All grades must be 'C', or better, with a minimum Grade point average in the five courses of 6.2.

Master of Arts in Public Administration
This program is normally offered in Day Division only, but it may be taken in Evening Division with the approval of the Director under the following conditions:
1. Admission under 'a' or 'b' below.
2. Passing a comprehensive examination prior to the conferring of a degree.
3. Completing all requirements in a period not exceeding five years.
4. Having previously completed in B.A. or graduate program at least one year of university residence.

Admission Requirements

a. A bachelor's degree, and the graduate Diploma in Public Administration with 'B' or better grades in at least four courses, and a Grade point average of 7.0 or better; or

b. A bachelor's degree in any honours course requiring four years from Senior Matriculation with second-class honours or better, or a bachelor's degree and an additional year of post-graduate work with at least second-class standing. If standing has not been obtained in Introduction to Political Science, Economic Principles, Canadian History, Public Administration, and Political Theory, a student may be required to complete some or all of these courses with 'B' or better grades, prior to undertaking the course requirements listed below. A prospective full-time student with only one or two prerequisite courses to make up, may take one of these during the summer prior to entry and/or may be permitted to audit or take one as an additional course during his full-time year.

If a student is without standing in all or most of these courses he will be required to register for the Graduate Diploma (see Diploma Admission Requirements, B.). An evening student may then, upon successful completion of three of the above courses with 'B' or better grades, apply for admission to the M.A. program. (A full-time student in this category would be allowed to choose his Diploma courses so that one or two of them could count toward his M.A. Upon the successful completion of his full-time year, he could then either take the Diploma or apply for admission with advanced standing to the M.A. program, which could then be completed in the Evening Division.)

Course Requirements

1. Political Science 540 (Theory and Practice of Administration)
or Political Science 545 (Comparative Public Administration)
2. Public Law 550 (Administrative) (This course must be elected if not previously taken.)
or Economics 450 (Economic Fluctuations and Stabilization Policy)
3. Political Science 400 (Government of Canada)
or Political Science 500 (Provincial and Municipal Government)
or Political Science 510 (The Political Process in Canada)
4. (a) An approved option, and either
Political Science 590 (Directed Study in a Selected Field)
or Political Science 598 (Research Essay)
or
(b) Political Science 599 (Thesis, equivalent to 2 courses)
Standing. A grade of 'B' or better must be obtained in each course counted for the M.A. degree.

Doctor of Philosophy

See program outlined under Political Science, and note language requirement.

Soviet and East European Studies

Chairman: Adam Bromke, M.A., PH.D.

Committee
David M. L. Farr, Dean, Faculty of Arts
John Porter, Director, Division II, Faculty of Arts
K. Arnold Frenzel (Economics)
George Melnikov (Russian)
George Roseme (Political Science)
John W. Strong (History)
Philip E. Uren (Geography)
Paul Varnai (Russian)

The expanding public interest in the USSR and East Europe, as well as the growing demand for specialists in this area in public service, foreign trade, journalism and teaching, led in 1963 to the establishment of an interdepartmental committee to foster Soviet and East European studies at Carleton University. The proximity of the University to several government libraries with a wealth of materials relating to the USSR and East Europe and the presence of embassies of these countries in Ottawa make Carleton a suitable centre for instruction and research in this field.

The Committee, composed of representatives of five departments in the humanities and social sciences, offers an Honours degree program in Soviet and East European Studies and also sponsors public lectures, conferences and extension courses relating to the Soviet Union and the Eastern European countries, and promotes exchanges of students and faculty with universities in the USSR and East Europe.

Honours Program
The objective of the Honours program is to equip students with the indispensable linguistic tools and to provide, through an interdisciplinary approach, an integrated knowledge of the cultures, historical developments and contemporary social, economic and political problems of the people of the area. The program leads to the degree of Bachelor of Arts with Honours in Soviet and East European studies.

Admission Requirements
Admission to the program will be granted only with the consent of the Committee on Soviet and East European Studies and with the approval of the Committee on Honours. Students with at least a 75% average in Senior matriculation or a 'B' standing (seven grade points) in the Carleton Qualifying University year, may be enrolled in Honours in the First year.

Course Requirements
Candidates for a degree in Soviet and East European studies will take twenty courses in four years. All courses must be approved by the Committee. The first two years will provide the foundation for an area concentration in the third and fourth years.

The following courses are obligatory:
A First year science or mathematics; English 100 or 101; Philosophy 100 or Humanities 100 (all three to be taken in the First year).
Russian 15, 100, 201 (to be taken in the first three years).
At least two of History 100, Economics 100, Political Science 100 (to be taken in the first two years).

Eleven additional courses are to be taken, of which at least six (given in no less than three different departments) are to be selected from among the following:

Russian: Advanced Composition and Conversation (Russian 301)
Nineteenth Century Russian Literature (Russian 250)
Russian Poetry (Russian 320)
Soviet Russian Literature (Russian 330)
Russian Drama (Russian 340)
The Russian Novel (Russian 350)
Russian Literature up to Pushkin (Russian 360)
Geography of the Soviet Union (Geography 360)
History of Modern Russian (History 260)
History of Eastern Europe (History 365)
Modern History of the Far East (History 385)
The Soviet Economy (Economics 370)
Economics of Planning (Economics 366)
Comparative Political Economy (Economics 470)
Soviet Government and Politics (Political Science 320)
Modern Political Thought (Political Science 430)
Soviet Foreign Policy (Political Science 570)

Note: Not all courses listed above are offered in any given year and not all combinations of courses are possible.

The remaining courses are to be selected in consultation with the Chairman of the program from the offerings of the Departments of Geography, History, Economics and Political Science.
A graduating essay which will carry the weight of a further course (to be written in the fourth year). Students whose graduating essays are concerned with Poland or Yugoslavia might be required to take non-credit courses in Polish or Serbo-Croat respectively.

Standing
Students must maintain Honours standing as prescribed by the general requirements (page 30.)

Faculty of Science

Dean of the Faculty: Herbert H. J. Nesbitt, M.A., PH.D., D.SC.

Admission Requirements
To the Qualifying University year of courses leading to the Bachelor of Science degree:
Requirements are the same as those for admission to the Bachelor of Arts degree (see p. 34), or by Mature Matriculation as prescribed above (p. 34).

To the First year of courses leading to the Bachelor of Science degrees:
(a) Completion of the Qualifying University year with an average of 'C' grade or better in mathematics and science subjects taken, *or*
(b) The attainment of the Ontario Secondary School Honour Graduation Diploma (Senior Matriculation—Grade XIII) or an equivalent certificate with a 60% general average, and with at least third class honours in the Mathematics and also in the Science subjects taken. Students with a slightly lower general average may be admitted if they can satisfy the University that they have a reasonable chance of success, and provided that laboratory space is available. Standing is required in the following:
1. English Composition and Literature
2. A language other than English
3. Mathematics (Algebra, Geometry, and Trigonometry)
4.
5. Two of: Physics, Chemistry, Biology (Botany and Zoology)

The University recognises that certain secondary school courses, such as the Physical Sciences Study Committee course, constitute an unusually good preparation for university work. Candidates offering such courses as part of their admission pattern will receive special consideration.

To the Second or subsequent years of courses leading to the Bachelor of Science degree:
Applications for admission to the Second or subsequent years will be evaluated on their merits and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University. Work taken in the Faculty of Engineering may be counted towards a degree in Science should the student wish to transfer from the Faculty of Engineering at the end of his first or second year.
Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements
Bachelor of Science
Length of course. Candidates for the B.Sc. pass degree will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. See also Course Load, p. 29.
Course selection. The B.Sc. course affords opportunity to specialize in one science subject, called a major, and to a lesser extent in a second subject, called a minor. The choice of a major normally will be made before the student begins his second year, in consultation with the department concerned. A subsequent change in major may be made only with the approval of both the departments concerned.
Standards of Entry to a Major Subject: To be eligible for promotion to Second year and entry to a major program a student (full or part-time) must have satisfied the University regulations set forth on p. 31 and have obtained at least two grades of C, one of which must have been in the subject in which he intends to major. A student who does not fail first year, but who does not meet the above requirements,

must repeat two of the courses in which he did not receive a grade of C— or better, or replace them by equivalent courses. His program must be approved by the department in which he intends to major.

Subjects in which majors may be taken are: Biology, Chemistry, Mathematics, Geology, Physics.

Courses will be selected from those listed under Details of Subjects, p. 72, as follows:

Qualifying University Year
1. English 10
2. A language other than English (a course numbered between 10 and 99)[1]
3. Mathematics 16*, 36* or equivalent.
4.
5. Two of: Chemistry 10, Physics 10, Geology 100, Biology 100

First Year
1. One of: Classical Civilization 200 or 201, English 100 or 101, Philosophy 100 or Humanities 100, or any other course in the humanities or social sciences numbered 100 or higher, chosen with the approval of the department in which the student intends to major.
2. Mathematics 100
3. Three of:
4. (a) Biology 100
5. (b) Chemistry 10 or 100
   (c) Geology 100
   (d) Physics 10 or 100

Second and Third Years
A total of ten courses, five in each year: normally at least four more courses in the student's major, at least two more in a minor field, and at least one course each year chosen from subjects other than the natural sciences and mathematics. The program of each student in the Second and Third years is under the direct supervision of a full-time member of the department in which he takes his major.

Language requirement. Before graduation, the candidate for the B.Sc. degree will be required to show that he has a reading knowledge of French, German, or Russian (or two of these, at option of the major department.)

Available Evening Courses. In several departments, most of the more advanced courses will normally be given, in whole or in part, in the day division only. Evening division candidates will therefore have to arrange to take certain of their major courses in the daytime. Candidates are advised to consult their major departments as early as possible to arrange their programs.

Bachelor of Science with Honours
The degree of Bachelor of Science with honours in a particular discipline is designed for those students who wish to deepen and extend their studies in one particular field for the purpose of preparing themselves for the graduate schools, or for entrance to the Specialists' Certificate of the Ontario College of Education. It is also a desirable preparation and in many cases an essential requirement for certain fields of employment.

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[1]See also p. 29, Substitution for Prescribed Subjects.
*An asterisk attached to a course number indicates a half-course.

Length of Course. Candidates for a degree with Honours will ordinarily take 25 courses in five years if admitted by Junior matriculation, or twenty courses in four years if admitted by Senior matriculation. With the permission of the department or departments concerned, it is possible for a candidate of exceptional ability to complete an Honours program in certain fields in three years from Senior matriculation by taking six courses in each winter session and one in each of the summers (if necessary, completing a graduation essay or thesis where required in the summer of the graduating year).

Course Selection. A candidate for Honours must choose a major subject or an approved combination of subjects, normally before entry to the Second year. Details of Honours courses may be found below under the respective departmental programs. Students wishing to qualify for entry to the Ontario College of Education in the course leading to the High School Assistant's Certificate Type A should consult the Registrar and the appropriate departments regarding course selection.

In the course prescriptions, the special requirements of each of the five departments in science is set forth in detail and students who wish to take advantage of the honours program are advised that they must consult with the Chairman of the Department of their choice.

At present the honours program is available in Biology, Chemistry, Geology, Mathematics, Physics, and combined Mathematics and Physics. Students may enter honours in science from Senior matriculation with at least 75% average or by transfer from the Pass course if 'B' or equivalent standing has been obtained. The First year of the honours science program consists of the present First year of the pass science, with the option of a sixth course, which may be chosen in consultation with a member of the major department.

Faculty of Engineering

Dean of the Faculty: John Ruptash, B.SC., M.A.SC., PH.D.

Bachelor of Engineering (offered in the Day Division only)

The Bachelor of Engineering degree is awarded on successful completion of a four year program of studies as outlined on p. 57ff. In the first three years the emphasis is on mathematics, physics, chemistry, and the engineering sciences. The following options or fields of study are offered in the fourth year of the B.Eng. curriculum: Civil Engineering, Electrical Engineering, Mechanical Engineering, and Engineering Physics.

The four engineering programs of study offered at Carleton University have been accredited and meet the academic requirements for professional engineering registration by the Association of Professional Engineers of the Province of Ontario. The programs of study also meet the academic requirements for professional registration in the provinces of Alberta, British Columbia, Manitoba, Newfoundland, New Brunswick, Saskatchewan, and Quebec. The degree of Bachelor of Engineering in Electrical Engineering satisfies the educational requirements of the Institution of Electrical Engineers of London, England, and carries complete exemption from the Institution's Examinations.

Admission Requirements

(a) *First Year*—For admission to the First year of the program of studies leading to the Bachelor of Engineering degree, an applicant must have passed the Qualifying University year examinations at Carleton University (see p. 35) with a grade of 'C' or better in Mathematics, Chemistry and Physics; *or* the Ontario Senior Matriculation (Grade XIII) examinations or equivalent examinations of other recognized examining bodies in the following subjects, with an *average of at least 60 percent*:

1. English Composition
2. English Literature
3. Algebra
4. Geometry
5. Trigonometry
6. Physics
7. Chemistry
8. One of: A language other than English*, History, Geography, Biology (Botany and Zoology).

In addition, the applicant must have passed the examinations in Algebra, Geometry, Trigonometry, Physics and Chemistry with an average of at least 65 percent.

(b) *Advanced Standing*—Applications for admission with advanced standing to the second or subsequent years of the program leading to the Bachelor of Engineering degree will be evaluated on an individual basis. Advanced standing for subjects completed at another university or college will be accepted only if the subject is recognized as the equivalent of a corresponding subject offered at Carleton University. Transfer of credit for the academic work of the first year of an Engineering program completed at another university or college will be considered provided the weighted grade point average is at least 1.6. Transfer of credit for the work of the second and third years will be considered provided the weighted grade point average is at least 1.8 and 2.0, respectively.

*An applicant must have credit in a language other than English at either the junior matriculation (Ontario Grade XII) or the senior matriculation (Ontario XIII) level.

Course Requirements

Candidates for the Bachelor of Engineering degree are required to complete a pre-scribed program of studies covering four years after Senior Matriculation. The pro-grams of study are outlined on pp. 57-60. The subjects comprising the programs of study are described under Details of Subjects, pp. 72-230.

A candidate for the Bachelor of Engineering degree must have at least six months of suitable practical experience in technical work. Evidence of appropriate summer employment or other technical experience must be submitted not later than the 1st of October on forms obtainable from the Faculty of Engineering. All students entering the fourth year of the engineering program must submit a summer essay. The summer essays are normally written on a topic drawn from the experience gained by the student during his summer employment. In addition to the regular course requirements, candidates for the B.Eng. degree are required to attend seminars and field trips arranged specially for undergraduate students.

First Year

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chem. 105 (Qualitative Analysis and Elementary Physical Chemistry)	3	3	3	3
English 115 (English)	3	3	–	–
Math. 100 (Introductory Calculus and Algebra)	5	5	–	–
Physics 100 (Introductory Physics)	3	3	3	3
Eng. 100 (Engineering Drawing)	1	1	5	5
Eng. 105 (Surveying)	2	–	–	–
Eng. 106 (Field Work in Surveying)*	–	–	–	–
Eng. 110 (Mechanics I)	–	3	–	–
	17	18	11	11

*Two and one-half weeks at the end of the second term.

Second Year

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chem. 215 (Physical Chemistry)	–	3	–	2
Geology 201 (Introductory Geology)	3	–	3	–
Math. 201 (Intermediate Calculus and Algebra)	4	4	–	–
Physics 230 (Introductory Electricity and Magnetism)	3	3	3	3
Eng. 211 (Mechanics II)	2	2	–	3/2
Eng. 220 (Mechanics of Materials I)	3	–	3	–
Eng. 265 (Computer Programming)	1	1	1	1
Eng. 270 (Elem. of Materials Science)	–	2	–	3/2
Elective (Humanity or Social Science)	3	3	–	–
	19	18	10	9

Third Year

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Math. 305 (Complex Variable)	3	–	–	–
Math. 306 (Math. Methods I)	–	3	–	–
Eng. 312 (Mechanics of Machines I)	2	–	–	–
Eng. 321 (Mechanics of Materials II)	–	2	–	3
Eng. 330 (Fluid Mechanics)	2	2	3/2	3/2
Eng. 340 (Thermodynamics)	3	–	3	–
Eng. 341 (Intro. to Heat Transfer)	–	2	–	3/2
Eng. 350 (Fundamentals of Electric Circuits and Machines)	3	3	3	3/2
Eng. 357 (Electronics I)	–	3	–	3/2
Eng. 366 (Computer Applications)	3	–	3/2	–
Elective (Atomic Physics, Humanity or Social Science)	3	3	–	–
	19	18	9	9

Fourth Year (Civil Engineering Option)

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Eng. 497 (Engineering Project)	–	–	4	6
Eng. 422 (Structural Analysis)	3	2	3/2	3/2
Eng. 423 (Reinforced Concrete)	–	3	–	3
Eng. 424 (Soil Mechanics)	3	–	3/2	–
Eng. 425 (Design of Structural Components)	3	–	3/2	–
Eng. 431 (Hydrology)	2	–	3/2	–
Elective (Engineering)	–	2	–	3/2
Elective (Basic Science or Engineering)*	2	2	3/2	3/2
Elective (Humanity or Social Science)	3	3	–	–
	16	12	11½	13½

*Engineering electives offered: 426—Design of Steel Structures, 428—Foundation Eng., 429—Highway Eng., 435—Hydraulic Machinery, 436—Hydraulic Structures, 471—Applied Materials Science.

Fourth Year (Electrical Engineering Option)

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Eng. 497 (Engineering Project)	–	–	4	6
Eng. 451 (Linear Systems)	3	2	–	–
Eng. 453 (Electric Transmission and Radiation)	–	3	–	3
Eng. 454 (Electromagnetic Fields)	3	–	–	–
Eng. 455 (Feedback Control Systems)	3	–	3/2	–
Eng. 458 (Electronics II)	2	3	3	3/2
Eng. 462 (Electrical Machines)	–	2	–	–
Elective (Basic Science or Engineering)*	2	2	3/2	3/2
Elective (Humanity or Social Science)	3	3	–	–
	16	15	10	12

*Engineering electives offered: 443—Energy Conversion, 456—Feedback Control Laboratory, 463—Advanced Electric Machines, 464—Electric Power Systems, 466—Switching Circuits, 475—Electrical and Magnetic Properties of Materials.

Fourth Year (Mechanical Engineering Option)

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Eng. 497 (Engineering Project)	–	–	4	6
Eng. 401 (Mechanical Analysis and Design)	2	2	3/2	3/2
Eng. 413 (Mechanics of Machines II)	2	–	3/2	–
Eng. 414 (Vibration Analysis)	2	–	–	3/2
Eng. 432 (Fluid Dynamics)	3	–	–	–
Eng. 442 (Applied Thermodynamics)	3	3	3/2	3/2
Eng. 443 (Energy Conversion)	–	3	–	3/2
Elective (Basic Science or Engineering)*	2	2	3/2	3/2
Elective (Humanity or Social Science)	3	3	–	–
	17	13	10	13½

*Engineering Electives offered: 435—Hydraulic Machinery, 437—Mechanics of Flight, 447—Refrigeration and Airconditioning, 452—Control Systems and Instrumentation, 455—Feedback Control Systems, 456—Feedback Control Laboratory, 462—Electrical Machines, 471—Applied Materials Science.

Fourth Year (Engineering Physics Option)

An outstanding student may be eligible for entrance to the fourth year option in Engineering Physics. The programs of study in the Engineering Physics Option consist of advanced courses in Mathematics, Physics, Chemistry, and Engineering, selected to suit the special interest and aptitude of each student. Eligibility and selection of courses must be approved by the Engineering Physics Committee.

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chemistry Elective	0–3	0–3	–	–
Mathematics Electives	3–6	3–6	–	–
Physics Electives	3–6	3–6	0–3	0–3
Engineering Electives	6–9	6–9	3–6	3–6
Humanity or Social Science Elective	3	3	–	–
	18	18	6	6

Standing. The average standing of a student is determined by assigning grade point values to each letter grade, as follows: A = 4, B = 3, C = 2, D = 1, F = 0.

Promotion Requirements. The general regulations regarding failure, repetition, and probation are outlined on p. 31.

In order to qualify for promotion from one year to the next, an engineering student must have passed either the final or the supplemental examination in every subject of his program, with a weighted grade point average of at least 1.4.

To qualify for supplemental examination privileges a student must attain a weighted grade point average of at least 1.0 in the final examinations.

If, after final and supplemental examinations, a student has failed to achieve standing in a subject which is a prerequisite for the course work of the following year, he may repeat the year's work or clear the deficiency as a part-time student. If the failed subject is not a prerequisite for the course work of the following year, the student may be conditionally promoted and may be permitted to repeat the failed subject as an extra subject, provided his weighted grade point average is at least 1.5.

If the academic standing of an engineering student does not meet the minimum promotion requirements, he may *either* clear his deficiency as a part-time student *or* apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year. The academic load for a repeated year in engineering must be at least the equivalent of 15 hours of lectures and 9 hours of laboratory per week or 18 hours of lectures and 6 hours of laboratory per week. Subjects in which a grade of 'B' or better was obtained need not be repeated. The required subjects of the succeeding year may be included as part of a repeated year program provided a grade of 'B' or better was obtained in the prerequisite subjects.

Graduation Requirements

In order to fulfil the minimum graduation requirements for the degree of Bachelor of Engineering, a candidate must have passed all the course requirements of the first to fourth years, inclusive, with an overall weighted grade point average of at least 1.5 and, in addition, must be recommended for graduation by the Faculty of Engineering.

Degrees with Distinction

Upon recommendation of the Faculty of Engineering, the notation "with High Distinction" may be made on the academic records of a candidate for the degree of Bachelor of Engineering. To receive this recommendation the candidate is expected to obtain a weighted grade point average of at least 3.4 in the course requirements of the final year and, in addition, a weighted grade point average of at least 3.0 in the course requirements of the first to fourth years, inclusive.

Upon recommendation of the Faculty of Engineering, the notation "with Distinction" may be made on the academic records of a candidate who achieves a weighted grade point average of at least 3.0 in the final year and, in addition, at least 2.6 in the course requirements of the first to fourth years, inclusive.

Master of Engineering

The Faculty of Engineering offers graduate courses leading to the Master of Engineering degree in the fields of Aeronautical Engineering, Civil Engineering, Electrical Engineering, and Mechanical Engineering. The courses offered are described under Details of Subjects, pp. 116-127. The graduate programs in engineering provide an opportunity for both full-time and part-time studies. Candidates who are employed on a full-time basis will normally require three academic years, or two academic years plus two summer terms, of part-time study to complete the requirements for a

Master's degree. The study load of a candidate who is employed full-time is restricted to a maximum of six lecture-hours per week.

In addition to the general requirements for admission to the Faculty of Graduate Studies, as specified on p. 66, a candidate for the Master of Engineering degree is required to have strong undergraduate preparation in Mathematics and Physics. Applicants who intend to specialize in the Aeronautical Sciences are expected to have credit, at the undergraduate level, for courses in Dynamics, Fluid Mechanics, Mechanics of Materials, Structural Analysis, Thermodynamics, Electronics, and Elementary Applied Aerodynamics. For Civil Engineering, applicants are expected to have credit at the undergraduate level, in Dynamics, Fluid Mechanics, Mechanics of Materials, Structural Analysis, Reinforced Concrete, Soil Mechanics, and Foundations. For Mechanical Engineering, applicants are expected to have credit at the undergraduate level, in Dynamics, Mechanics of Machines, Machine Design, Mechanics of Materials, Fluid Mechanics, Thermodynamics, Heat Transfer, Electrical Circuits and Electronics. Applicants who intend to specialize in the Electrical and Electronic Sciences are expected to have credit, at the undergraduate level, for courses in Feedback Control Systems, Electrical Machines, Electronics, Electromagnetic Field Theory, Electrical Transmission, Circuit Analysis, Electrical Transient Phenomena.

Courses offered by applicants, as undergraduate preparation for the Graduate Program, should be comparable, in level and content, to courses offered in the current Faculty of Engineering undergraduate curriculum. Since most graduate courses are based on the work of the senior undergraduate year, applicants should examine carefully the descriptions of courses carrying 400 numbers in their area of interest. Detailed information regarding prerequisites to a particular course may be obtained from the Dean of Engineering.

The graduate study program in engineering is an elective program. Candidates may select a number of courses which relate to their particular field of interest or activity. Individual programs must, however, form an integrated, balanced unit with emphasis on one, or at most two, aspects of the field of specialization. The program of studies will ordinarily include four courses in the first term; three courses in the second term and a thesis. The program must include at least two graduate level courses in Engineering, both terms. Each candidate will be required to take an oral examination on the subject of his thesis and related fields. The examination will be conducted by an Examining Board appointed by the Dean of the Faculty of Engineering.

All candidates are required to demonstrate, to the satisfaction of the Examining Board, their ability to solve a reasonably complex problem, related to their field of specialization, using either an electronic analogue or a digital computer. The Board will accept credit in an appropriate course, or may, at its discretion, conduct an independent examination.

The thesis must represent the results of the candidate's independent research or development work, undertaken after admission to graduate standing at Carleton University. Experimental or theoretical results, previously published by the candidate, may be used only as introductory or background material for the thesis. A candidate may be permitted to carry on thesis research work off-campus providing the work is approved in advance and arrangements have been made for supervision of thesis-research activities by a faculty member of Carleton University. A part-time student may use the Faculty of Engineering laboratory facilities for on-campus thesis research and development activities. In such cases a period of not less than three calendar months of full-time University residence is required.

A candidate for the Master's degree who has, before admission, completed independent research or development projects of an adequate level of accomplishment, may apply to the Faculty of Graduate Studies for a waiver of the thesis requirement. Such applications must be made at the time of initial registration and must be supported by

copies of published reports describing the work. If the application is approved, the candidate must take two additional graduate courses, one of which must be in Engineering, to fulfil the requirement for the award of a degree without a thesis. A candidate who has been granted a waiver of the thesis requirement will be required to take an oral examination on the subject of one of his published papers and topics related to his field of specialization.

Credit for one graduate course completed with a grade of 'A' or 'B' at another University may be offered in partial fulfilment of the requirements for award of the Master of Engineering degree, providing the course submitted for transfer credit is appropriate to the candidate's graduate program at Carleton University, and the credit for the course has been earned not more than three years prior to admission to graduate standing at Carleton. Application for transfer of credit must be made at the time of initial registration.

A member of the faculty will be associated with each degree candidate as counsellor. The candidate is required to meet his counsellor during the week preceding registration to discuss and determine his program of study.

A limited number of students, who are not candidates for the Master of Engineering degree, may be admitted to each graduate Engineering course as special students. An applicant for special student status requires the consent of the instructor. This consent must be obtained no later than the week preceding registration. Special students are expected to write the regular examinations in the course and must register during the normal registration period. Credit earned as a special student cannot be counted towards the requirements of an advanced degree in Engineering.

Doctor of Philosophy in Engineering

The Faculty of Engineering offers courses of study and research leading to the degree of Doctor of Philosophy in Engineering in the fields of Aeronautical, Civil, Electrical and Electronic, and Mechanical Engineering. For admission to a doctoral program an applicant must hold a Master's degree in Engineering, or its equivalent, and, by his previous program of study and scholastic record, demonstrate a capacity for advanced study and research.

Candidates are subject to the General Regulations of the Faculty of Graduate Studies, pages 66-68, in addition to the particular requirements of the Faculty of Engineering. The program of studies must include at least two graduate courses in Engineering, at least one advanced course in Mathematics, at least one advanced course in Physics, or Chemistry or Geology, and a substantial thesis. Concurrent with preparation of the thesis a minimum period of twelve calendar months of full-time University residence is required. All candidates will be required to take a comprehensive examination which will ordinarily include both written and oral examinations. Each candidate will also be required to take a final oral examination on the subject of his thesis and related fields.

The Faculty of Engineering requires a candidate to demonstrate an understanding of a second language sufficient to support short-term residence in an area where that language is indigenous. The candidate will satisfy the language requirement in three steps.

(i) Show standing of C or better in a full course at the introductory level, offered at Carleton, in a language other than English, appropriate to his area of professional interest.

(ii) Demonstrate reasonable understanding, on sight, of material contained in selected samples of the daily press in that language.

(iii) Translate on sight from the language into English and from English into the language a group of technical terms appropriate to his area of professional interest selected from an assigned vocabulary of some five hundred words.

If a candidate whose mother tongue is not English elects his mother tongue as the second language, he will be required to demonstrate a high degree of proficiency in translation of a wide range of general engineering literature.

The Graduate Seminar
The Graduate Seminar meets every week throughout the Fall and Spring terms. Current research, recent publications, thesis proposals and progress reports are among the topics discussed. The Seminar also meets, irregularly, during the summer. Attendance at the Graduate Seminar is mandatory for all full-time graduate students in the Faculty of Engineering.

Fellowships for Graduate Studies
Fellowships, ranging in value from $1,600 to $2,800, are available to full-time students. In addition, well qualified applicants will be considered for graduate assistantships carrying a stipend of up to $850 for the academic year. These awards are made only after the applicant has gained admission to the Faculty of Graduate Studies. Applications for such awards will be received up to March 1st, 1966.

Carleton Computing Facility
The Carleton University Computing Centre is equipped with an International Business Machines Company Type 1620 Data Processing System. Use of the Centre is granted to candidates registered in certain courses and for individual thesis research activities on the recommendation of the thesis supervisor and the Dean of the Faculty of Engineering.

Faculty of Graduate Studies

Faculty of Graduate Studies

Dean of the Faculty:
M. S. Macphail, M.A., D.PHIL., F.R.S.C.

Courses leading to Master's degrees are offered in Biology, Canadian Studies, Chemistry, Economics, Engineering (Aeronautical, Civil, Electrical, Mechanical), English, French, Geology, History, International Affairs, Mathematics, Philosophy, Physics, Political Science, Public Administration, Psychology, Sociology. Courses leading to Doctor's degrees are offered in Biology, Chemistry, Engineering, Geology, Mathematics, Physics, Political Science, Psychology. Each candidate will be under the direction of a department, institute, or school, and must comply with any special conditions prescribed. Graduate students are under the general regulations of the University, and also those stated below. Candidates are advised that the number of places is limited, and even if their qualifications are satisfactory, it may not be possible to admit them. If the candidate's application is received by April 1, every effort will be made to inform him as to acceptance by May 1.

A candidate who wishes to graduate at the May convocation must submit his thesis (where applicable) by April 1.

As stated in the inside front cover of this Calendar, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular courses. Graduate courses may have to be withdrawn if the enrolment of full-time degree candidates is insufficient.

Master of Arts, Master of Science, and Master of Engineering

Admission Requirements
Candidates must normally have a bachelor's degree with at least second class standing for admission, and those with pass degrees will require the equivalent of two years' full-time study, while those with honours degrees will require the equivalent of one year's full-time study. Other candidates with equivalent standing may be admitted on departmental recommendation, subject to the approval of the Faculty of Graduate Studies. Candidates may be required to make up deficiencies in their background. A grade of B or better must be obtained in each course counted for credit towards the Master's degree.

Course Requirements
The requirement for the final year of the Master's degree will be five courses or the equivalent. Directed special studies may be counted as one course, while a substantial thesis based on the student's own research may be counted as two courses. Some courses may be selected from those open to undergraduates (200-499), but when such a course is taken for graduate credit the completion of additional assignments may be required. At least three courses (including the thesis) must be selected from those numbered 500-599.

Examinations
In addition to the usual examinations in individual courses, each candidate will be required to take either an oral examination on his thesis or a comprehensive examination on his field. At the direction of his department, both examinations may be required, or they may be combined. Departments may also require examinations in languages other than English.

Time Limitation
A candidate who fails to complete the requirements for the degree within five years from the date of his admission into the final year must, if he wishes to continue, apply for extension of time. A student who, within this period, remains unregistered in his

degree program for a period of more than 16 months, will lose his graduate student status.

Thesis

The candidate must provide four typewritten copies (original and three carbons), or acceptable duplicated copies, on a suitable grade of paper, 8½ by 11 inches. The thesis must be typed double-space, in a standard type-face, on one side of the paper, with at least 1½ inch margin at the left. The candidate must meet any special requirements of his department governing the form of the thesis, including methods of bibliographical entry, use of diagrams, tables, and the like. A suitable abstract is to be provided. The original copy should be presented in an envelope, unbound in order of pagination, and the copies in spring binders, with the pages not mutilated in any way. The candidate gives the University the right to microfilm, photostat, and circulate the thesis and abstract, as may be required.

Doctor of Philosophy

Admission Requirements
Candidates will ordinarily have already taken the Master's degree.

Course and Thesis Requirements
The period of formal study and research required in the Ph.D. program will be at least two years of full-time study, or the equivalent, beyond the Master's qualification. The thesis will ordinarily carry a weight of about one half of the total requirement. The thesis must be a contribution to knowledge, and must demonstrate the candidate's capacity to undertake sustained research and to report the results in a fashion appropriate to the subject matter. The regulations stated above for the Master's thesis also apply.

Examinations
(a) A qualifying examination may be set at the beginning of the course.

(b) A comprehensive examination covering prescribed fields will be set, ordinarily one year before the thesis is to be presented. This examination, which may be oral or written, or both, may include any work fundamental to a proper comprehension of the major subject.

(c) After the thesis has been received and approved, a final oral examination on the subject of the thesis and related fields will be held.

(d) Language requirements will be prescribed by departments, according to the needs of their students, and subject to approval by the Faculty of Graduate Studies. For further information see the departmental programs.

Time Limitation
A candidate who fails to complete the thesis within five years after his admission must, if he wishes to continue, apply for extension of time.

Graduate Fees

Full-time—M.A. M.Sc. M.Eng.	Qualifying graduate year. Same fee as for undergraduates (See p. 26).	
	With honours standing, or after qualifying year	$400
	For second year, if necessary	300
Ph.D.	First year	400
Ph.D.	Second year	400
Ph.D.	For residence thereafter, per year	100
Ph.D.	For non-residence, to keep name on books, per year	25

Fees for part-time students per course: $95

In addition, there is an annual registration fee of $25 for all part-time graduate students; the same fee applies to non-resident Master's candidates, to keep name on books, and to students who defer completion of thesis beyond the fall convocation.

Included in the above composite fee for full-time students are the following:

Students' Association	$9.00
Athletics	1.00
Health Services	1.00
University Union Contribution	4.00

The above schedule of fees is subject to revision.

Graduate fellowships, bursaries, loans.
These are available for competition and application as described on p. 249.

School of International Affairs

Committee of Management
Davidson Dunton, President of the University
David M. L. Farr, Dean, Faculty of Arts
S. F. Kaliski (Economics)
Gilles Paquet (Economics)
G. C. Merrill (Geography)
Philip E. Uren (Geography)
John W. Strong (History)
Michael Fry (History)
R. A. MacKay (Political Science)
Douglas G. Anglin (Political Science)
Adam Bromke (Political Science)
K. Z. Paltiel (Political Science)
Harald von Riekhoff (Political Science)
George Roseme (Political Science)
F. J. E. Jordan (Public Law)

Research Fellow in Defence Studies: M. E. Sherman

The School of International Affairs seeks to encourage and promote graduate study, research, public education and publication in the field of international affairs. It offers a program of advanced studies leading to the degree of Master of Arts in International Affairs for persons preparing for careers in universities, government, business, journalism and other spheres. The School is also concerned to stimulate research in international affairs. In addition to providing facilities for faculty research, it intends to establish a number of research professorships and fellowships, to promote publication, and to assist visiting specialists to take full advantage of the research potentialities of the national capital. The School also sponsors occasional special seminars and public lectures.

The School is administered by a Director and an interdepartmental Committee of Management composed of university officers and faculty members concerned with teaching and research in international affairs. There is also an Advisory Council which includes eminent persons from outside the University in addition to members of the Committee of Management.

Acting within the policies approved by the Committee of Management and subject to the general academic requirements laid down by the Faculty of Graduate Studies and the Senate, the Director administers the affairs of the School and co-ordinates the participation of the various interested departments. He has broad authority to recommend the admission of students and to approve their programs of study. He is also responsible for the research and publishing program of the School and for encouraging financial support for its activities.

Master of Arts in International Affairs
Admission Requirements
1. An Honours degree or its equivalent in History or Political Science with at least good second class standing (GPA of 7.6) and *three* international affairs courses including *An Introduction to the History of International Relations* (History 380), or *International Politics* (Political Science 260/261) or equivalents. Applications from persons with Honours degrees in other disciplines will be assessed on their merits. Candidates without the necessary courses in international affairs in their undergraduate program will have to take additional courses.
2. Candidates possessing a Pass degree in History or Political Science with at least second class standing (GPA of 7.0) may be admitted to the qualifying year. Applications from majors in other disciplines will be considered on their merits.

3. A working knowledge of French. In certain cases, candidates may be permitted to meet this requirement during their course, or to substitute another approved major language.

Degree Requirements
A program will be worked out in each individual case in accordance with the academic background, interests and needs of the candidate. Persons intending to proceed to the Ph.D. should inform the Director as early as possible in order that their MA program may be planned with this in mind.

Qualifying Year
Five approved courses selected with a view to providing students with the necessary background in more than one discipline for advanced study in international affairs. Students who have not already completed a basic course in international relations must take either *An Introduction to the History of International Relations* (History 380), or *International Politics* (Political Science 261). In addition, at least two other international affairs courses are required. The balance may be chosen from related fields. A GPA of 7.6 is required to proceed to the Master's year.

Master's Year
1. *Three* approved graduate courses, including the *Interdisciplinary Seminar* (International Affairs 500), and at least one other international affairs course. (The interdisciplinary seminar will not be offered in 1965-66. Instead, candidates will choose some other international affairs course.)
2. A comprehensive oral examination to test the ability of the candidate to relate various disciplines to the study of international affairs.
3. A substantial thesis involving original research on an approved subject in the field of international affairs (equivalent to two courses). In special circumstances, candidates may take two additional courses, including one in international affairs, instead of submitting a thesis.
4. At least good second class standing (GPA of 8.0) on the work of the Master's year.
5. The ability to read and converse in French (or in certain cases a major language other than English or French) with moderate fluency. The oral French requirement may be met by successfully completing French 201.

Doctor of Philosophy in Political Science
Although the School does not offer a doctorate in International Affairs, students may study for the degree of Doctor of Philosophy in Political Science with emphasis on international relations. International relations may be chosen as one of the three fields of concentration (the other two may be chosen from political theory, political institutions, public administration, the politics of a particular country or area, and an approved field in a related discipline). In addition, the thesis, which is equivalent to half the requirements for the degree, may be written on an aspect of international relations.

Course Offerings
For course descriptions, see departmental listings.

International Affairs Courses
Interdisciplinary Seminar (International Affairs 500)
Offered jointly by the participating departments.
The theme will be selected annually. Not offered 1965-66.

International Trade (Economics 460)
Political Geography (Geography 440)
An Introduction to the History of International Relations 1900-1939 (History 380)
Modern History of the Far East (History 385)
Canada-United States Relations (History 443)
The British Commonwealth of Nations (History 473)
International Politics (Political Science 261)
International Institutions (Political Science 460)
Canada in World Affairs (Political Science 560)
American Foreign Policy (Political Science 565)
Soviet Foreign Policy (Political Science 570)
Africa in World Affairs (Political Science 580)
Contemporary International Politics (Political Science 585)
Tutorial in Defence Studies (Political Science 590)
International Law (Public Law 555)

Related Courses
The Soviet Economy (Economics 370)
Comparative Political Economy (Economics 470)
Geography of the Humid Tropics (Geography 320)
Soviet Union (Geography 360)
Geography of the Northern Lands (Geography 430)
Europe (Geography 250)
Modern Russia (History 260)
History of Modern Europe, 1715-1919 (History 315)
History of Eastern Europe (History 365)
Government and Politics in Western Europe (Political Science 210)
The Commonwealth in Asia and Africa (Political Science 310)
Soviet Government and Politics (Political Science 320)
Modern Political Thought (Political Science 430)
Comparative Federalism (Political Science 505)
Nationalism (Political Science 520)
Comparative Public Administration (Political Science 545)

For additional courses, see departmental listings.

Details of Courses

The course numbering pattern is, in general, as follows:

10-99   Courses usually taken in the Qualifying University year.
100-199   Courses usually taken in the First year.
200-299   Courses usually taken in the Second year.
300-399   Courses usually taken in the Third year.
400-499   Courses ordinarily taken by students in the Fourth year, that is, final year of Engineering or Honours Arts and Science.
500-599   Courses ordinarily taken by Graduate students.

N.B. Half courses are marked with an asterisk (with the exception of Engineering half courses).

A listing of discontinued courses is available upon request to the Office of the Registrar, Carleton University.

Interdisciplinary Courses

Humanities 100

An examination of selected works, from Biblical times to the present, illustrating the various dominant views on the nature of man and his attempts to understand himself and the world about him.
Day Division: Annually (lectures three hours a week).
B. Wand, and members of the faculty

Science 100

This course is designed to acquaint students in the Arts, Humanities, and Social Sciences with what science really is. Beginning with a general discussion of the aims, objectives, and methods of the experimental sciences, the course will examine in detail the evolution and development of one major scientific contribution, and its effect upon subsequent thought.
Day Division: Annually (lectures three hours a week).
H. H. J. Nesbitt

Engineering 65, 1620 Fortran Programming

A non-credit half course open to students of the second and more senior years. Organisation of the 1620 digital computing system, the stored-program concept, loops and branches, flow-charts. The grammar of 1620 FORTRAN IID. An elementary treatment of error propagation. Users' Libraries. The course comprises ten hours of lectures and sixteen hours of workshop activity. Enrolment is limited to sixty students. Lectures and Workshop 2 hours a week, one term.

Engineering 360, Introduction to Computer Science

Number systems, data representation and storage. Arithmetic operations, electronic gates and registers. Digital computer organisation; command and address structure; machine languages and their properties. Iteration and recursion. Computability. Flow-charts and their symbolism. Algorithms. Symbolic and problem orientated languages. Compilers; FORTRAN and ALGOL, COBOL. Non-numeric processing, ALPAK. Computational errors. Introduction to automata. A collection of modern essays discussing the impact of computing systems on various areas of society will be designated as required reading. (Half course).
Lectures 3 hours a week, laboratory 2 hours a week, second term.

Non-Departmental Degree Courses

Fine Arts

Courses in the history of Fine Arts have been offered by Carleton University in co-operation with the National Gallery of Canada. The collections and study materials of the National Gallery afford the student unusual opportunities for direct observation. Carleton University intends to offer courses for academic credit on both the visual arts and music as soon as possible.

Italian 15, Introduction to Italian

A beginning course. Grammar, reading, and oral practice.
Not offered, 1965-66.

Italian 100, Italian Literature

A brief but inclusive review of Italian literature, with emphasis on reading and study of the important texts. Composition and oral practice.
Not offered, 1965-66.

Accounting

Associate Professor   R. Caterina
Assistant Professor   W. R. Scott
Sessional Lecturers   C. N. Brennan, W. A. Karney, A. B. Larose, N. G. Ross
                           A. A. Sterns

Accounting is basically communication—communication of the results of business activity to interested parties such as shareholders, investors, statisticians, governments; and also communication to business management of the information needed to aid in managing the enterprise.

As firms continually become larger and more complex, the need for information on financial position and results of operations becomes greater and at the same time this information becomes more difficult to obtain and interpret.

A knowledge of the means by which the accounting process records and summarizes transactions and attempts to present the results in a meaningful manner is necessary to anyone who uses or relies on financial statements.

Students who, after achieving the B.Com. degree, intend to proceed to professional accounting degrees—Chartered Accountant (C.A.), Certified General Accountant (C.G.A.), or Registered Industrial and Cost Accountant (R.I.A.)—should consult Professors Caterina or Scott before entering final year of the Commerce course.

Accounting 100, Elementary Accounting

The theory and practice of accounts, including the purpose of the double entry analysis of transactions; the establishment of financial classifications through the medium of books of original entry and the ledgers; the preparation of periodic financial statements and a study of the accounting entries required for that purpose; an introduction to the concepts of costs and of revenues and to the problems of effecting a periodic matching in the accounts; partnership and corporation accounting.
Day Division: Annually (lectures two hours a week; weekly problem periods).
Evening Division: Annually (lectures two hours a week; bi-weekly problem periods).
Members of the Department

Accounting 200, Intermediate Accounting

The theory and practice of accounts with particular attention to the corporate form of business organization; accounting application of legal and policy considerations regarding capital stock, retained earnings and appropriations thereof, bonds and other liabilities; problems in the valuation of inventories, investments, plant and equipment and other assets; present status of accounting standards and terminology, with particular reference to the preparation of financial statements; techniques employed in the analysis and interpretation of accounting data.
Prerequisite: Accounting 100.
Day Division: Annually (lectures two hours a week, weekly problem periods).
R. Caterina, W. R. Scott
Evening Division: Annually (lectures two hours a week, occasional problem periods).
C. N. Brennan

Accounting 300, Advanced Accounting

A study of the means whereby a business firm expands—consignment and agency accounts, branches, mergers and amalgamations, parent and subsidiary companies, decentralization of operations. In addition to illustrating the accounting methods involved, attention will be given, by use of case studies where appropriate, to the use of accounting methods to control the expansion. Certain topics of business finance and partnership accounting will also be considered.
Prerequisite: Accounting 200.
Evening Division: 1965-66.
W. R. Scott

Accounting 321*, Historical Development of Accounting Theory and Practice

A study of the evolution of the techniques and theory of accounting. An examination of the pragmatic basis of accounting and its development to meet the changing information needs of the business community. Current areas of accounting controversy will be analyzed and studied within their historical perspective. The reaction of accounting practices to changing economic conditions, and pronouncements of the major professional accounting bodies will be studied.
Prerequisite: Accounting 200.
Not offered, 1965-66.
W. R. Scott

Accounting 325, Cost Accounting

The field of cost accounting including a study of the elements of costs; analysis of types of costs; distribution of cost elements to units of production in job cost systems and process cost systems; cursory treatment of estimated and standard cost systems.
Prerequisite: Accounting 200.
Evening Division: Annually (lectures two hours a week, occasional problem periods).
A. A. Sterns

Accounting 340, Government Accounting and Finance

A study of government budgeting, accounting and financial reporting practices. The practices of the Government of Canada will be described and compared with practices of other governments, crown corporations, and business enterprises.
Evening Division: 1965-66 (lectures two hours a week).
N. G. Ross

Biology

Professor	H. H. J. Nesbitt
Professor; Chairman of the Department	G. Setterfield
Associate Professors	J. M. Anderson, W. I. Illman, D. A. Smith, J. A. Webb, F. Wightman (on leave of absence, 1965-66)
Assistant Professor, and Curator of the Herbarium	Isabel L. Bayly
Assistant Professor	T. W. Betz
Lecturer	Jean P. Fletcher
Sessional Lecturers	Mary-Lou Florian, E. Small
Demonstrators	Elizabeth M. Arnason, C. W. Leggatt
Teaching Fellows	M. Y. Javaid, V. N. Kagwade
N.R.C. Post-Doctorate Fellow	A. J. Mia

Undergraduate Programs

Students reading for Honours or Pass degrees in Biology must arrange their courses, in consultation with the Chairman of the Department, in one of the patterns outlined below. They must, in addition, demonstrate a reading knowledge of French, German or Russian.

Major in Biology

Pass B.Sc. in Biology

Students reading for a Pass Bachelor of Science degree in Biology must satisfy the general requirements for Science stated on pp. 53-55, and arrange their courses in the following pattern:

Year I: Biology 100; Chemistry 100; either Physics 100 or Geology 100; Mathematics 100; either English 100 or 101.

Year II: Biology 205 and 210; either Physics 100 (compulsory if not taken in Year I) or Biology 215; a second course in the minor field (a science or Mathematics); either Philosophy 100 or Humanities 100.

Year III: Biology 340 and 360; a third course in the minor field; either Biology 215 (compulsory if not taken in Year II) or an optional science course; an optional non-mathematics, non-science course.

Pass B.A. in Biology

Students who plan to read for a Pass Bachelor of Arts degree in Biology must obtain permission from the Chairman of the Department before registration, satisfy the general requirements for Arts stated on pp. 34-37, and arrange their courses in the following pattern:

Year I: Biology 100; Chemistry 105; three courses chosen from three of Groups 1 to 4 of the Arts requirements on p. 34.

Year II: Biology 205, 210, 215; one course to complete the Arts I requirements; one additional course.

Year III: Biology 340 and 360; three additional courses at an advanced level.

Pass B.A. in Biology (Pre-medical)

Prospective pre-medical students are advised that many medical schools prefer that candidates who read for a Bachelor's degree prior to entry into Medicine obtain a sound grounding in basic science and arts subjects rather than anticipate medical school courses. To this end, a special program leading to the Pass Bachelor of Arts degree in Biology (Pre-medical) has been designed. This includes Biology 100, 205, 210, 215, and 340; Chemistry 105 and 220; Physics 100; Mathematics 100; English 100 or 101; Philosophy 100 or Humanities 100; a social science; a language course

numbered in the 100's; and two optional courses, which might include Sociology, Psychology, or Statistics. Interested students should consult the Chairman of the Department to arrange their pre-medical program to meet the individual requirements of the medical school to which they hope to gain admission.

Honours Degree Program

Students planning a professional career in biology are strongly advised to enter the Honours program as soon as possible, and certainly by the end of the second year. An Honours degree is almost essential for admission to graduate studies. Students reading for an Honours Bachelor of Science degree in Biology must satisfy the general requirements for Honours stated on pp. 36 and 54 and arrange their course programs in consultation with the Chairman of the Department. The following course program is recommended:

Year I: Biology 100; Chemistry 100; Physics 100; Mathematics 100; English either 100 or 101.

Year II: Biology 205, 210, and 215; a course in the minor field (a science or mathematics); either Philosophy 100 or Humanities 100.

Year III: Biology 360 and either 425 or 435; a course in the minor field; an optional science course; an optional non-mathematics, non-science course. One or two courses of Year III may be postponed to Year IV in order that available Honours courses may be taken in Year III.

Year IV: Biology 425 or 435 (whichever was not taken in Year III), and 498; three additional courses at an advanced level.

Honours students must pass an oral comprehensive examination at the conclusion of their period of study.

Students wishing to obtain the Ontario College of Education Interim High School Assistant's Certificate, Type A, are advised to consult the Chairman of the Department as soon as possible in their university career in order that an appropriate Honours program may be arranged. (See also p. 23).

Graduate Studies

Members of the Department of Biology are engaged in advanced study and research in the following fields of Biology: Animal Physiology, Cytology, Ecology, Entomology including Acarology, Mammalogy, Mycology and Plant Pathology, Plant Physiology and Plant Biochemistry, Plant Systematics, Plant Anatomy, and Wildlife Biology. Graduate students of the necessary competence are welcomed at both the M.Sc. and Ph.D. levels.

Candidates for graduate degrees must satisfy the general requirements of the Faculty of Graduate Studies and in addition demonstrate a reading knowledge of the following languages in addition to English:

M.Sc.—either French or German.

Ph.D.—two languages, one of which must be French or German.

Biology 100, Introductory Biology

An introductory lecture and laboratory course on the fundamental principles of biology.

Text: To be announced.

Day Division: Annually (lectures three hours a week, laboratory four hours a week)

T. W. Betz and J. A. Webb

Evening Division: 1965-66 (lectures three hours a week, laboratory four hours a week).

Mary-Lou Florian

Biology 205, Animal Morphology

A course on the comparative morphology of the major animal groups.
Texts: Torrey, Morphogenesis of the Vertebrates; others to be announced.
Prerequisite: Biology 100.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
T. W. Betz and Jean Fletcher

Biology 210, Plant Morphology

A course on the morphology, reproduction, and historical evolution of plants.
Texts: Bold, Plant Morphology.
Foster and Gifford, Comparative Morphology of the Vascular Plants.
Prerequisite: Biology 100.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
W. I. Illman
Day Division: Summer, 1965 (lectures twelve hours a week, laboratory sixteen hours a week).

Biology 215, Genetics

A lecture and laboratory course on the mechanisms of inheritance and gene function.
Text: Herskowitz: Genetics.
Prerequisite: Biology 100.
Day Division: Annually (lectures two hours a week, laboratory four hours a week).
G. Setterfield

Biology 340, Physiology

A lecture and laboratory course on the fundamental principles of plant and animal physiology. This course is designed for Pass Degree students only: Honours students are directed to Biology 425 and 435.
Texts: Prosser and Brown: Comparative Animal Physiology.
Scheer: Animal Physiology.
Prerequisites: Biology 100 and Chemistry 100 or 105.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
J. M. Anderson and J. A. Webb

Biology 360, Ecology

A course on the principles of plant and animal ecology. As part of his practical work, each student must carry out an ecological project during the summer before the course is taken (normally in Year III) and he must submit a report and collections of voucher specimens during the fall term. Immediately before the opening of the fall term, he must attend a field course illustrating important principles and techniques of field biology through studies of selected biotic communities. Further information may be had on application to the Department.
Texts: Odum: Fundamentals of Ecology.
Kendeigh: Animal Ecology.
Dansereau: Biogeography.
Prerequisites: Biology 205 and 210.
Day Division: Annually (lectures two hours a week, laboratory and seminars four hours a week).
Isabel Bayly and D. A. Smith

Honours Courses

Biology 400 (Botany 330* and 332*), Phycology and Mycology

A course on the morphology, evolution, and biological importance of the algae and fungi.
Text: Smith: Cryptogamic Botany, Vol. I.
Prerequisite: Biology 210.
Day Division: 1966-67 and alternate years (lectures two hours a week, laboratory four hours a week).
W. I. Illman

Biology 405, Invertebrate Zoology

An advanced course on the phylogeny and development of invertebrate animals.
Text: Borradaile, Eastham, Potts and Saunders, The Invertebrata.
Reference Texts: Grassé, Traité de Zoologie, appropriate volumes.
Prerequisites: Biology 205 and 215.
Day Division: 1966-67 and alternate years (lectures two hours a week, laboratory four hours a week).
H. H. J. Nesbitt

Biology 410, Developmental Botany

A course in which the cells and tissues of plants will be studied as developing systems, traced from their meristematic origins, through differentiation to maturity.
Text: To be announced.
Prerequisite: Biology 210.
Day Division: 1966-67 and alternate years (lectures two hours a week, laboratory four hours a week).
Isabel Bayly

Biology 415, Chordate Zoology

An advanced course on the classification, geographic distribution and evolution of the major groups of chordates. As part of his practical work, each student must make a collection of chordates, preferably during the summer before the course is taken. Detailed directions may be had on application to the instructor.
Texts: Colbert: Evolution of the vertebrates.
Orr: Vertebrate biology.
Prerequisite: Biology 205.
Day Division: 1965-66 and alternate years (lectures two hours a week, laboratory four hours a week).
D. A. Smith

Biology 420, Cytology

A study of the structure, composition, and function of cells at the microscopic and macro-molecular levels.
Text: To be announced.
Prerequisites: Biology 215 and a course in physiology at least concurrently.
Day Division: 1965-66 and alternate years (lectures two hours a week, laboratory four hours a week).
G. Setterfield

Biology 425, Plant Physiology

A lecture and laboratory course on the water relations, mineral nutrition, carbon and nitrogen metabolism, and growth and development in plants.
Texts: Meyer, and Bohning: Introduction to Plant Physiology.
Fogg: The Growth of Plants.
Conn and Stumpf: Outlines of Biochemistry.
Prerequisites: Biology 100 and Chemistry 100.
Day Division: 1966-67 and alternate years (lectures two hours a week, laboratory four hours a week).
F. Wightman and J. A. Webb

Biology 430, Microbiology

The general principles and practice of microbiology. Consideration will be given to the biologic, economic, ecologic, and industrial importance, and to the metabolic processes and the taxonomy of autotrophic, saprobic, and parasitic bacteria, yeasts, moulds and actinomycetes.
Prerequisites: Chemistry 220 and a course in physiology at least concurrently.
Day Division: 1965-66 (lectures two hours a week, laboratory four hours a week).
W. I. Illman

Biology 435, Animal Physiology

A study of the general principles underlying the functional activities of cells, tissues, organs, and the intact body of a wide variety of animals.
Text: Reference list to be assigned.
Prerequisites: Biology 100, Chemistry 100 and Physics 100.
Day Division: 1965-66 and alternate years (lectures two hours a week, laboratory four hours a week).
J. M. Anderson

Biology 440 (Botany 420), Taxonomy of the Flowering Plants

A general survey of the flowering plants, the bases for classification, and the history of taxonomy. A project will be assigned.
Text: Lawrence, Taxonomy of Vascular Plants.
Prerequisites: Biology 210.
Day Division: 1965-66 and alternate years (lectures two hours a week, laboratory four hours a week).
Isabel Bayly

Biology 450, Cellular Physiology and Biochemistry

A lecture and laboratory course on the comparative physiology and biochemistry of plant and animal cells.
Prerequisite: Biology 340 and Chemistry 220.
Not offered, 1965-66.

Biology 455, Histology and Embryology

A lecture and laboratory course on the fundamental principles of the histology and embryology of the chordates.
Text: To be announced.
Prerequisite: Biology 205.
Day Division: 1966-67 and alternate years (lectures three hours a week, laboratory three hours a week).
T. W. Betz

Biology 460, Entomology

A course on the morphology and physiology of representatives of the more important orders and families of insects. Students planning to take this course must consult with the instructor in the previous spring to arrange for insect collections.
Reference Texts: Snodgrass, Principles of Insect Morphology.
Wigglesworth, Insect Physiology.
Prerequisite: Biology 205.
Day Division: 1965-66 (lectures two hours a week, laboratory four hours a week).
H. H. J. Nesbitt and Elizabeth Arnason

Biology 475, History of Biology

A seminar course on the history of biology and biological theory.
Prerequisites: Biology 215, a course in physiology at least concurrently and permission of the instructor.
Day Division: 1965-66 (seminar hours to be arranged).
H. H. J. Nesbitt

Biology 485, Principles of Systematic Zoology

A course devoted to an intensive study of the principles and methods of animal classification.
Prerequisite: Permission of the Department.
Not offered, 1965-66.

Biology 490, Directed Special Studies and Seminar

Day Division: Annually.
Members of the Department

Biology 498, Research Project

Students reading for an Honours degree in Biology may do a research project under the direction of one of the members of the Department.
Prerequisite: Permission of the Department.
Day Division: Annually (subject and laboratory hours to be arranged).
Members of the Department

Graduate Courses

Biology 500, Advanced Genetics

A seminar and problem course in the principles and practice of modern genetic theory.
Prerequisites: Biology 215 and a course in statistics.
W. I. Illman or G. Setterfield

Biology 520, Advanced Cytology

An analysis of recent developments in the study of cell structure and function.
Prerequisite: Biology 420.
G. Setterfield

Biology 550, Selected Topics

To meet special needs of students, a course in advanced aspects of specialized
biological subjects not covered by other graduate courses may be offered.
Prerequisite: Permission of the Department.
Members of the Department

Biology 590, Directed Special Studies and Seminar

Prerequisite: Permission of the Department.
Members of the Department

Biology 599, Master's Research and Thesis

Prerequisite: Permission of the Department.
Members of the Department

Biology 699, Doctoral Research and Thesis

Prerequisite: Permission of the Department.
Members of the Department

Botany 500, Mycology

An advanced course devoted to the morphology, reproduction, taxonomy, and evolu-
tion of the fungi.
Prerequisite: Biology 400.
W. I. Illman

Botany 510, Plant Physiology

An advanced course in Plant physiology.
Prerequisite: Biology 340 or Biology 425.
F. Wightman and J. A. Webb

Botany 520, Plant Biochemistry

An advanced course in plant biochemistry.
Prerequisite: Biology 340 or Biology 425.
F. Wightman and J. A. Webb

Botany 540, Plant Taxonomy

Prerequisite: Biology 440.
Isabel Bayly

Botany 560, Plant Ecology

Prerequisite: Permission of the Department.
Isabel Bayly

Zoology 510, Acarology

An advanced course devoted to the Acari (mites).
Prerequisite: Biology 460.
H. H. J. Nesbitt

Zoology 520, Advanced Entomology I

A course devoted to an advanced study of insect morphology and phylogeny.
Prerequisite: Biology 460.
H. H. J. Nesbitt

Zoology 525, Advanced Entomology II

A course devoted to an advanced study of insect taxonomy.
Prerequisite: Biology 460.
H. H. J. Nesbitt

Zoology 530, Advanced Entomology III

A course devoted to an advanced study of insect physiology.
Prerequisites: Biology 340 and 460.

Zoology 540, Mammalogy

A seminar and laboratory course on the taxonomy, distribution, and ecology of mammals.
Prerequisites: Biology 360 and 415.
D. A. Smith

Zoology 550, Advanced Animal Physiology

A course dealing with some of the techniques used, and the concepts in recent advances in animal physiology.
Prerequisite: Biology 435.
J. M. Anderson

Zoology 560, Animal Ecology

Prerequisite: Permission of the Department.

84

Chemistry

Professor; Chairman of the
Department   J. M. Holmes
Professors   P. M. Laughton, J. M. Morton
Associate Professors   C. H. Amberg, D. R. Wiles
Assistant Professors   J. W. ApSimon, J. A. Koningstein, P. Kruus, M. Parris,
                                    R. H. Wightman
Sessional Lecturers   Irene Brownstein, Virginia Prince
Senior Demonstrators   R. T. Elworthy, D. J. Herbertson, Jean Griffin,
                                    Jacqueline Guthrie, Vera Rolko
Postdoctoral Fellow   J. Betts

General

Students intending to major in Chemistry should have a strong background and interest in Mathematics and Physics. The programs of study can be varied somewhat from those outlined below depending on the interest of the student. However, the following outline represents the basic core of the Chemistry program and any deviation from this must be done in consultation with the Department.

Major Program (minor in Mathematics and Physics)

Year I	Year II	Year III
Chem. 100	Chem. 210	Chem. 250 or 220
Physics 100	Chem. 220 or 250	one of Chem. 310, 320 or 350
Math. 100	Math. 200 or 201	An additional Math.
Biol. 100 or	Physics 230	Physics 210
Geol. 100	Language	Social Science
Arts Elective		

Biology or Geology minors would omit the additional Mathematics course in Year III and Physics 210 and substitute Biology or Geology courses as recommended.

Honours Program (minor in Mathematics and/or Physics)

Year I—as in Major Program

Year II	Year III	Year IV
Chem. 210	two of Chem. 310,	one of Chem. 410, 420, 430,
220	320 or 350	440 or 450
250	an additional Math.	remaining 300 Chem. course
Math. 200	Physics 210	Physics or Math.
Physics 230	Social Science or	Chem. 499
	Language	Optional course

Normally a minor requires four courses and for Biology or Geology minors substitutions as in the Major Program are recommended. Each candidate for Honours is required to demonstrate a reading knowledge of two of scientific French, German, and Russian.

Seminars

Weekly seminars will be presented on research topics by research scientists, graduate students, and final year honours students. Chemistry honours students in Third and Fourth year are required to attend all departmental seminars.

Thesis

Each candidate for honours in Chemistry is required as part of Chemistry 499 in the final year to carry out a research project and to write a thesis. Four typewritten copies of this thesis are to be deposited with the Chemistry Department not later than April 15, 1966. One copy of the thesis may be returned to the candidate.

Graduate Studies

Graduate studies at the M.Sc. and Ph.D. levels are offered in the Department in the major fields of Chemistry. Normally graduate work in Chemistry must be conducted full-time in residence, and research work must be done in the Department's laboratories under the supervision of the full-time faculty. In addition to the general requirements, candidates for the M.Sc. and Ph.D. in Chemistry are required to pass either oral or written comprehensive examinations before submission of a thesis and to demonstrate a reading knowledge in two of scientific French, German, and Russian. All graduate students are expected to attend all departmental seminars.

Chemistry 10, Introductory Chemistry

An introductory course emphasizing the fundamental laws and principles of chemistry. The more important metals and non-metals and their compounds are studied.
Texts: Nebergall Schmidt Holtzclaw, General Chemistry (2nd Edition).
Malm and Frantz, College Chemistry in the Laboratory 2.
Pierce and Smith, General Chemistry Workbook.
Day Division: Annually (lectures three hours per week, laboratory three hours per week).
Virginia Prince

Chemistry 100, General Chemistry

Gases, liquids, solids, and solutions, chemistry of selected groups of elements and their compounds, including both inorganic and organic compounds; and a qualitative survey of the most important theories used to explain this behaviour: energy relationships, electron structure and the periodic table, quantization of energy, theories of chemical bonding and of chemical reaction. The laboratory will involve qualitative and elementary quantitative analysis, elementary physical chemistry, and the preparation of certain organic and inorganic compounds.
Texts: Lecture text to be announced.
Sorum, Introduction to Semimicro Qualitative Analysis.
Prerequisites: Chemistry 10 and Mathematics 16* and 36* or equivalents, and matriculation for the Bachelor of Science degree.
Day Division: 1965-66 (lectures three hours per week, laboratory three hours per week).
J. M. Holmes

Chemistry 105, General Chemistry

Lecture and laboratory outline the same as Chemistry 100 above.
Texts: Lecture text to be announced.
Sorum, Introduction to Semimicro Qualitative Analysis.
Schaum, Theory and Problems of College Chemistry.
Prerequisites: Chemistry 10 and Mathematics 16* and 36* or equivalent and enrolment in a program other than for the degree of Bachelor of Science.
Day Division: Annually (lectures three hours per week, laboratories three hours per week).
J. M. Morton

Chemistry 210, Introductory Physical Chemistry

The thermodynamic and kinetic-molecular descriptions of equilibrium and non-equilibrium properties of gases, solids, liquids, solutions of non-electrolytes and electrolytes; chemical and phase equilibria, surfaces and macromolecules, chemical kinetics.
Texts: Moore, Physical Chemistry.
Daniels, Mathews and Williams, Experimental Physical Chemistry.
Prerequisites: Chemistry 100 and Mathematics 100.
Day Division: Annually (lectures three hours per week, problems one hour per week, laboratory three hours per week).
C. H. Amberg

Chemistry 215*, Physical Chemistry for Engineers

Kinetic-molecular theory of ideal gases, imperfect gases, the solid and liquid states, thermodynamics and chemical statistics, chemical and phase-equilibria, electrochemistry, chemical kinetics, surface chemistry, and colloids.
Text: Moore, Physical Chemistry.
Prerequisites: Chemistry 105 and Mathematics 100.
Day Division: Annually (three hours lectures and two hours problem analysis per week). Second term only.
J. M. Holmes

Chemistry 220, Elementary Organic Chemistry

Structure, synthesis and reactions of the main functional groups with emphasis on aliphatic and simple aromatic systems. An introduction to bonding and mechanisms. The laboratory includes synthesis and characterization of the more important functions and an introduction to modern instrumentation.
Text: Roberts and Caserio, *Basic Principles of Organic Chemistry*.
Prerequisite: Chemistry 100.
Day Division: Annually (lectures three hours per week, laboratory four hours per week).
Evening Division: Next offered, 1966-67.
P. M. Laughton

Chemistry 250, Elementary Inorganic and Analytical Chemistry

The chemical principles underlying gravimetric, volumetric and simple instrumental analysis. Elements of bonding theory and descriptive chemistry of typical elements. Laboratory work in gravimetric, volumetric and instrumental analysis with simple inorganic syntheses.
Texts: Bell and Lott, *A Modern Approach to Inorganic Chemistry*.
Vogel, A Textbook of Quantitative Inorganic Analysis.
Prerequisites: Chemistry 100 and Mathematics 100.
Day and Evening Divisions: 1965-66 (lectures three hours per week, laboratory four hours per week).

Chemistry 310, Physical Chemistry

Introduction to the quantum mechanics of atoms and molecules, electric and magnetic properties of molecules, atomic, molecular and magnetic resonance spectroscopy, structure of molecules and crystals, chemical bond energies, intermolecular interactions.
Texts: Kauzmann, Quantum Chemistry.
Brand and Speakman, Molecular Structure.
Shoemaker and Garland, Experiments in Physical Chemistry.
Prerequisite: Chemistry 210.
Day Division: Annually (lectures three hours per week, problems one hour per week, laboratory three hours per week).
J. A. Koningstein

Chemistry 320, Intermediate Organic Chemistry

Resonance theory, aromaticity, structure reactivity relationships and conformational analysis. The study of the important classes of reactions from a mechanistic viewpoint. An introduction to applications of spectroscopy to structural elucidation in organic chemistry. Structure proof and synthesis. The laboratory work will consist of small scale preparations and project-type experiments using modern techniques.
Texts: Roberts and Caserio, *Basic Principles of Organic Chemistry*.
Gould, *Mechanism and Structure in Organic Chemistry*.
Cross, *An Introduction to Practical Infrared Spectroscopy*.
Prerequisite: Chemistry 220.
Day Division: Annually (lectures three hours per week, laboratory four hours per week).
J. W. ApSimon

Chemistry 350, Intermediate Inorganic Chemistry

Radioactivity and its chemical applications, elementary quantum theory of atomic and molecular structure, other modern theories of chemical bonding. Chemistry of the transition metals, solid state chemistry of ionic compounds and metals. Mechanisms of inorganic reactions. The laboratory work consists of the synthesis and study of compounds by advanced methods: high temperature methods, non-aqueous solvents, vacuum methods, and others, and extensive use of radioactive tracer methods.
Texts: Cotton and Wilkinson, Advanced Inorganic Chemistry.
Jolly, Synthetic Inorganic Chemistry.
Prerequisites: Chemistry 210 and 250.
Day Division: Annually (lectures three hours per week, laboratory four hours per week).
M. Parris and D. R. Wiles

Honours Courses

Chemistry 410, Statistical Mechanics and Chemical Kinetics

First term: Development of the equilibrium theory of statistical mechanics and relations between molecular properties and thermodynamic functions of gases, liquids and solids.

Second term: Experimental and theoretical aspects of the mechanics of chemical reactions in the gas phase, in solution and on surfaces.
Texts: Davidson, Statistical Mechanics.
Frost and Pearson, Kinetics and Mechanism.
Prerequisite: Chemistry 310 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours per week).
P. Kruus

Chemistry 420, Advanced Organic Chemistry

Physical organic chemistry, stereochemistry, and selected topics in the chemistry of natural products.
Prerequisites: Chemistry 320 and permission of the instructor.
Day Division: Annually (lectures three hours per week, laboratory by arrangement).
Texts: To be announced.
R. H. Wightman

Chemistry 430, Advanced Inorganic Analysis

Theory and practice of selected instrumental methods of analysis. Some special analyses by standard methods may be assigned.
Texts: To be announced.
Prerequisites: Chemistry 210 and 250 and permission of the instructor.
Day Division: 1965-66 (lectures three hours per week, laboratory four hours per week).
J. M. Morton

Chemistry 440, Biochemistry

An introduction to plant and animal biochemistry available to students planning to specialize in biochemistry.
Prerequisites: Chemistry 220 and permission of the Department.
Day Division: Annually (lectures three hours per week, laboratory three hours per week).

Chemistry 450, Advanced Inorganic and Radiochemistry

Ligand field theory, modern theories of structure and reaction mechanisms. Theories of nuclear structure and decay, nuclear measurements, radiochemical methods, hot atom chemistry. Advanced laboratory projects in inorganic chemistry and radiochemistry are available.
Reference Books: Cotton and Wilkinson, Advanced Inorganic Chemistry.
Friedlander, Kennedy and Miller, *Npclear and Radiochemistry,* Second Edition.
Harvey, Introduction to Nuclear Physics and Chemistry.
Prerequisites: Chemistry 350 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours per week).
M. Parris and D. R. Wiles

Chemistry 499, Research Project and Seminar

Senior students in Honours Chemistry will carry out a research project under the direction of one of the members of the Department.
Day Division: Annually.

Graduate Courses

Chemistry 510, Quantum Chemistry

To be announced

Chemistry 511, Statistical Mechanics and Thermodynamics

To be announced

Chemistry 512, Chemical Kinetics

To be announced

Chemistry 513, Surface Chemistry and Catalysis

J. M. Holmes and C. H. Amberg

Chemistry 520, Physical Organic Chemistry

P. M. Laughton

Chemistry 522, Natural Product Chemistry

J. W. ApSimon

Chemistry 540, Graduate Seminar in Biochemistry

To be announced

Chemistry 550, Inorganic Chemistry

M. Parris

Chemistry 555, Nuclear Chemistry

D. R. Wiles

Chemistry 590, Directed Special Studies

Members of the Department

Chemistry 599, Master's Research and Thesis

Members of the Department

Chemistry 699, Doctoral Research and Thesis

Members of the Department

Classics

Professor	A. J. Earp
Associate Professor:	
Chairman of the	
Department	F. Ellenor M. Swallow
Associate Professor	A. Trevor Hodge
Lecturer	Terence R. Robinson
Sessional Lecturer	A. R. Wedderspoon

Qualified students may read for Honours in Classics, or students may elect Latin, or Greek, or a combination of the two as their major field of study in a Pass course; or students who are reading for honours in another discipline may elect either Latin or Greek as a minor.

Combined Major work or Honours work in either Greek or Latin and another discipline may be arranged upon consultation with the departmental chairmen concerned.

Major in Classics
Major in Latin: 5 Latin courses to be chosen in consultation with the department; Classics 490; Classical Civilization 201 (301).

Major in Greek: 5 Greek courses to be chosen in consultation with the department; Classics 490; Classical Civilization 200 (300).

Major in Classics:
Emphasis on Latin: 4 Latin and 3 Greek courses to be chosen in consultation with the department; Classics 490.
Emphasis on Greek: 4 Greek and 3 Latin courses to be chosen in consultation with the department; Classics 490.
Note: A general examination, either written or oral, will be given to all students in their final year of a "major" program, in addition to the regular course examinations.

Honours Course
First year Arts
The general requirements for First year Arts will be followed, with the following possibilities:
1) A student may be recommended to postpone one requirement until Second year in order to take both Greek and Latin from the beginning of his university course.
2) If his past record so warrants he may be recommended to take a sixth course, thus accomplishing the balance of languages from the start and the reduction of course load in the final year when he is preparing for a general examination.
Second, Third and Fourth years*:
Emphasis on Latin:
5 further courses in Latin.
Classical Civilization 201 (301) (Roman history).
Classics 490 (Seminar).
3 further courses in Greek.
4 options.
Emphasis on Greek:
5 further courses in Greek.
Classical Civilization 200 (Greek History).
Classics 490 (Seminar).
3 further courses in Latin.
4 options.

*Students may enter an honours course later than Second year, but it is likely to involve considerable re-adjustment of the program of Classics and options in the last two years.

(In either case, a fifteenth course, in the appropriate grouping for the student's own course pattern, will be necessary, if five courses and not six were taken in First year Arts).

Total: 20 courses in 4 years, of which at least 12 must be classical.

Note: At the end of an honours course, students will be required to take a comprehensive examination, either written or oral, to test their general knowledge in the field of Classics. Although no specific grade will be assigned here, a student will not be recommended for the degree unless he has passed this examination satisfactorily. Also, it will be taken into consideration, along with all work done in the Classics department, in the awarding of first, high second, or second class honours.

Graduate Studies

It is anticipated that a program of studies leading towards a master's degree in Classics will commence on a part-time basis in 1966-67. Inquiries are invited.

Offerings for 1965-66 are as follows:

Greek 15, Introduction to Language and Reading

A beginning course to introduce students not only to grammar and syntax, but also to the reading of continuous prose.
Day Division: 1965-66 (lectures and practice periods four hours a week).
T. R. Robinson

Greek 100, Literature and Reading

Study of the forms and development of Greek literature. Reading: Euripides, one play; Lysias, select orations. Some time will also be devoted to prose composition.
Prerequisite: Greek 15 (115) or the equivalent.
Day Division: 1965-66 (lectures three hours a week).
A. T. Hodge

Greek 240, The Orators

Oratory, a written and a spoken art among the Greeks.
Prerequisite: A 100 course, or permission of the department.
Day Division: 1965-66 (two tutorial hours a week).
Ellenor Swallow

Greek 420, The Lyric Poets

Both personal and choral lyric will be read.
Prerequisite: A 100 course, or permission of the department.
Day Division: 1965-66 (two tutorial hours a week).
Ellenor Swallow

Greek courses offered in rotation with the senior courses listed above:

150 Composition and Sight Translation
260 Philosophy
280 The Tragedians
300 History: Herodotus and Thucydides
320 Homer
410 (360) Aristophanes

Latin 10, Language and Reading

Review of grammar and syntax; composition. Reading: selections from various authors in prose and verse.
Prerequisite: Junior Matriculation Latin or the equivalent. Students without preparation in Latin will not be admitted to this class.
Day Division: 1965-66 (lectures three hours a week).
T. R. Robinson

Latin 100, Literature and Reading

Study of the history of Latin literature. Reading: Selections from various authors throughout the classical period.
Prerequisite: Latin 10 or the equivalent.
Day Division: 1965-66 (lectures three hours a week).
A. T. Hodge

Latin, 280, Virgil

Reading of Virgil, and a study of classical epic poetry.
Prerequisite: A 100 course or permission of the department.
Day Division: 1965-66 (two tutorial hours a week).
A. J. Earp

Latin 410, Oratory

Theory and practice of the Roman orators.
Prerequisite: A 100 course, or permission of the department.
Day Division: 1965-66 (two tutorial hours a week).
A. R. Wedderspoon

Latin courses offered in rotation with the senior courses listed above:

150 Prose Composition

260 The Historians

340 Lyric and Elegy

360 Latin Letters

380 Comedy and Satire

420 (320) Philosophy

Seminar

Classics 490, Special Problems

Required of students taking their major work, or reading for Honours, in Classics.
Not offered 1965-66.

Classical Civilization 200, Greece in the Ancient World

The history and civilization of classical Greece with special attention to the development of her characteristic institutions. (This course is also listed as History 200).
Evening Division: 1965-66 (lectures two hours a week). This course will be given in the evening and day divisions in alternate years.
T. R. Robinson

Classical Civilization 201, Rome in the Ancient World

The history of ancient Rome, her growth and expansion, and her organization during the Republic and the early Empire. (This course is also listed as History 201).
Day Division: 1965-66 (lectures two hours a week). This course will be given in day and evening divisions in alternate years.

Classical Civilization 310, Greek Literature in Translation

The development of Greek literature and literary forms from Homer to the Hellenistic period, with extensive reading of Greek authors in English translation.
Not offered, 1965-66. This course will be alternated with Classical Civilization 311.

Classical Civilization 311, Latin Literature in Translation

The development of Latin literature and literary forms from the earliest times to the early Empire, with extensive reading of Latin authors in English translation.
Day Division: 1965-66 (lectures two hours a week). This course will be alternated with Classical Civilization 310.
Ellenor Swallow

Classical Civilization 320, A Social and Economic Survey of the Ancient World

A study of ancient religion, politics, law, trade, slavery, and other institutions characteristic of Greek and Roman society.
Evening Division: 1965-66 (lectures two hours a week). This course will be alternated with Classical Civilization 330.
A. T. Hodge

Classical Civilization 330, Classical Art and Archaeology

A study of the material remains of the ancient world from Minoan Crete and early Greece to the Roman Empire, with special attention to pottery, sculpture, painting, and architecture.
Not offered, 1965-66. This course will be alternated with Classical Civilization 320.

Classical Civilization 429, Selected problems in Greek and Roman history

This course is also listed as History 429, and is given for honours students in History and in Classics. Some knowledge of Latin at least (if not Greek) is highly desirable.
Prerequisite: Permission of the department.
Day Division: 1965-66 (two seminar hours per week).
T. R. Robinson

Economics

Professor: Chairman of the
Department   S. F. Kaliski
Professor   H. S. Gordon
Associate Professors   T. N. Brewis, R. Caterina (Accounting), H. E. English
       (on leave of absence, 1965-66), D. McDougall
Assistant Professors   R. L. Carson, E. U. Choudhri, K. A. Frenzel,
       W. I. Gillespie, K. A. J. Hay, N. H. Lithwick, G. Paquet,
       T. K. Rymes, W. R. Scott (Accounting)
Sessional Lecturers   W. Anderson, J. Kuiper, J. C. Mills

The Economics courses are divided into six categories

1. Economics 100—to be taken in First year.
2. Basic courses in theory, economic history and statistics. Economics 200, 210, 225, (or 325), and 220—appropriately taken in Second year. Statistics may be taken in the Mathematics department in lieu of Economics 220).
3. Second or Third year options—courses numbered 325-399.
4. Senior options—courses numbered 400-479—normally taken in Third or Fourth year (also see Graduate Studies).
5. Special honours courses—courses numbered 480-499—for honours students only.
6. Graduate seminars and thesis—Economics 500, 530, and 580.

Major Courses

Students seeking admission to the major or honours programs in Economics will normally be expected to have credits in Grade 13 Mathematics (Algebra, Geometry and Trigonometry), or the equivalent. Mathematics 101 is a requirement in the First year.

A student will normally be permitted to major in Economics only if he or she obtained a 'C' grade in Economics 100.

Students who major in Economics will take at least six Economics courses—categories 1 and 2 and at least one course from category 4. One of the category 2 courses may be postponed to Third year. The student's program for the Second and Third years must be approved by the Chairman of the Department of Economics.

Honours Courses

Economics. Honours programs may be entered from the Honours First year in the Social Sciences (see p. 37), or by transfer from the major course if second class standing has been obtained.

The honours requirements include courses in categories 1 and 2, at least two from category 4, and the modern classics tutorial and honours essay (category 5). Each student will be assigned a tutor in his Third and Fourth years. Honours students, including combined honours students, will take a comprehensive examination (written and oral) at the end of the final year. They will not be required to write final examinations in their Economics courses in their Third and Fourth years.

The student's program for the Second and subsequent years will be planned in consultation with the Chairman of the Department of Economics.

Combined Honours in Economics and Political Science

Students intending to take this course should take Economics 100 or Political Science 100 (or preferably both) in the First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two departments. The honours requirements include at least six courses in Economics and six courses in Political Science, one of which must be Political Science 498 or Economics 498, to be taken in the student's final year. These will be arranged so that the student may transfer either to full honours in Political Science or to full honours in Economics at the end

of the Third year, if he then wishes to specialize more intensively. Students must also meet the language requirements of the Department of Political Science.

Combined Honours in Economics and Mathematics
Students will have a choice of a combination of economics and pure mathematics or economics and statistics. In either case, they will take seven courses in economics and eight in mathematics and meet the two departments' requirements for comprehensive examinations. Each year's program should be determined in consultation with the two departments.

The Economics courses taken shall be: Economics 100, 200, 210, 225 or 325, 400 or 492, 498 and one other in category four. The mathematics courses taken in the first two years shall be Math 100, 200, 210, 255* and 256*. Those of the final two years shall be *either* Math 300, 310, 307* and 308* or 407* and one other in the 300 or 400 series, *or* Math 350, 355* and 358* and 356* and 357*, and one other in the 300 or 400 series.

Consideration will also be given to applications for Combined Honours in Economics and History, and Economics and Sociology.

Graduate Studies
The Department of Economics offers studies leading to the degree of Master of Arts in both day and evening divisions.

A student wishing to enter the M.A. program must have an honours degree in Economics or its equivalent in both content and standing. Applicants are referred for guidance as to the meaning of this requirement to the department's own honours requirements on page 95. A candidate may be required to supplement his basic undergraduate work by taking appropriate undergraduate courses at Carleton in addition to his work for the M.A. A student holding a pass degree and no further training will ordinarily be required to take a qualifying year before being admitted to M.A. candidacy.

A candidate for the M.A. in economics will (1) take the two graduate seminars and an approved course from category 4 (in which additional work may be assigned), (2) present a thesis[1] and (3) pass comprehensive examinations. Grades of B or better must be obtained throughout in courses, comprehensives, and thesis.

Thesis topics must be chosen in fields in which a member of the department is prepared to supervise the work. At present, these include: Money and Banking, Public Finance, International Trade, Industrial Organization and Public Policy, History of Economic Thought, Economic Growth and Development, and North American Economic History, Labour Economics.

Economics 10, Economics and Society

An introduction for Colombo Plan students to the concepts and ideas of political economy. Other students from overseas may be admitted with the permission of the instructor.
Day Division: 1965-66 (lectures and discussion groups, three hours a week).
T. N. Brewis

[1]A candidate in the final M.A. year is asked to note that, if he wishes to receive his degree at the Spring Convocation following his registration in the previous Fall, four copies (see Calendar pp. 66-7) of his thesis must be submitted to the Department at least eight weeks prior to Convocation.

Economics 100, Principles of Economics

An introduction to the concept of economic welfare and its relation to society's other economic goals, e.g. the efficient use and allocation of resources, an appropriate rate of growth of production, and stability in output, employment and prices. The basic principles and statistical measures used in examining these goals and the means of achieving them are discussed. Public policies affecting the distribution of income, the control of monopoly, and the maintenance of stability in employment and prices are also discussed.

Day Division: Annually (lectures and classes, four hours a week).
Evening Division: Annually (lectures and classes, four hours a week).
N. H. Lithwick, D. McDougall, and Members of Department
Summer Session: 1965 (lectures five hours a week).
K. A. Frenzel

Economics 200, Price Theory

The modern analysis of production and distribution with special reference to the determination of the conditions which maximize social welfare. The major causes of departure from the social welfare optimum in a full employment economy, with particular attention to imperfections in competition.

Prerequisite: Economics 100.
Day Division: Annually (lectures two hours a week).
Evening Division: 1965-66 (lectures two hours a week).
R. L. Carson, W. I. Gillespie, K. A. J. Hay, S. F. Kaliski

Economics 210, Monetary Theory and Institutions

An examination of modern macroeconomic theory, with special reference to domestic and international monetary theory. A survey of Canadian and international financial institutions and arrangements. A critical examination of macroeconomic problems and and the policies advocated for their solution.

Prerequisite: Economics 100.
Day Division: Annually (lectures two hours a week).
Evening Division: 1965-66 (lectures two hours a week).
E. U. Choudhri, K. A. J. Hay, T. K. Rymes
Summer, 1965 (lectures 5 hours a week).
J. C. Mills

Economics 220, Statistical Methods in the School Sciences

An introduction to the principal statistical measurements. The use of statistical analysis as a method for the precise and reliable acquisition of knowledge in the social sciences will be stressed. The misuse of statistical information will be examined. (This course is listed also as Sociology 205. Economics 220 will yield a half credit only, if Mathematics 255* has been taken for credit and will yield no credit if Psychology 205 has been taken for credit).

Prerequisites: Mathematics 15*, 25* and 35*, and one of Economics 100, Political Science 100, Sociology 100; *or* the permission of the instructor.
Day Division: Annually (lectures two hours a week, laboratory two hours a week).
N. H. Lithwick, G. Paquet

Economics 225, Economic History

An examination of the development of economic institutions, especially those aspects of history which may be used to explain the character of the principal economic institutions and practices of the present day. (This course is also listed as History 225).
Prerequisite: Economics 100, *or* the permission of the instructor.
Day Division: 1965-66 (lectures three hours a week).
D. McDougall

Economics 321*, National Accounting

An introduction to the modern social accounting framework encompassing the national product accounts, the input-output accounts, and national transactions accounts, with emphasis on Canadian practice. Attention will be paid to new developments such as national wealth accounts, constant dollar accounts, productivity measurement and an examination of the Social accounts for underdeveloped and socialist countries.
Prerequisite: Economics 100.
Not offered, 1965-66.

Economics 325, The Economic Development of Canada

An examination of the development of the Canadian economy with emphasis on the post-Confederation period. Attention will be focused on the changing patterns of internal and external factor and commodity flows, productivity, and technological change. Frequent comparisons with U.S. economic development will be made. (This course is also listed as History 325).
Prerequisite: Economics 100 or History 230 or 235.
Evening: 1965-66 (lectures two hours a week).
Summer, 1965 (lectures five hours a week).
G. Paquet

Economics 335, Political Economy in the Modern State

A study of some basic problems of political and economic organization and public policy which raise important questions of both economic theory and political theory and are best examined by means of a combination of the two. The problems studied will be one of current interest, but the historical evolution of the relevant political and economic ideas will be introduced where this assists the understanding of contemporary institutional practices and policy approaches. (This course is also listed as Political Science 335).
Prerequisites: Economics 100, Political Science 100, and a further course in either Economics or Political Science.
Day Division: 1965-66 (lectures and seminars, 2 hours a week).
H. S. Gordon

Economics 340, Problems of Area Development

A seminar on the location of economic activity and the problems of those areas lagging behind in economic development, with particular reference to the Canadian scene. Measures to improve the lot of these areas and the rationale of the underlying public policy.
Prerequisite: Economics 100 and the permission of the instructor.
Evening Division: 1965-66 (lectures two hours a week).
T. N. Brewis

Economics 345, Agricultural Economics

An examination of the agricultural industry in the national economy and in low income societies. The course will emphasize the working out of the basic forces which determine supply-demand for the industry and the functional distribution of income among the factors of production. The place of institutions will be examined and public policy will be critically reviewed.
Prerequisite: Economics 100.
Evening Division: 1965-66 (lectures two hours a week).
W. Anderson

Economics 350, Business Finance

A study of the financial aspects of business operations. Topics include the flow of funds within the business, planning for short- and long-term needs for funds, capital structure, expansion and reorganization; the markets for long- and short-term capital.
Prerequisites: Economics 100 and Accounting 100.
Day Division: 1965-66 (lectures three hours a week).
R. Caterina

Economics 355, Labour Economics and Industrial Relations

An examination of labour as a factor of production with regard to the origin of a rational labour market and its structure, function, and the policy implications thereof with respect to both 'perfect' and 'imperfect' markets. The development of an industrial relations system; the theory, structure, and function of trade unions; their history and public policy towards them; and an evaluation of them as institutions.
Prerequisite: Economics 100.
Evening Division: 1965-66 (lectures two hours a week).
K. A. Frenzel

Economics 366*, Economics of Planning

An examination of the theoretical problems of economic planning both at the micro and at the macro levels. Investigation of the equilibrium and optimality conditions of centrally directed economic systems. Study of programming techniques and an attempt to establish the foundations of a theory of rational macrodecision. Some economics of information.
Prerequisite: Economics 200 and 210 or permission of the instructor.
Evening Division: 1965-66 (lectures two hours per week, second term).
G. Paquet

Economics 370, The Soviet Economy

The analysis of the Soviet economy from the point of view of questions significant to the economist. Essentially a discussion of the method of determining wants and the structure through which they are implemented, i.e., the plan, the price system, the method of balances (including input-output and linear programming), investment choice, the organization and structure of industry and agriculture, financial and non-financial controls and incentives. The unique nature and problems of the Soviet economy will be discussed.
Prerequisite: Economics 100; further work in Economics would be highly desirable.
Day and Evening Division: 1965-66 (lectures two hours a week).
K. A. Frenzel

Economics 400, Mathematical Economics and Econometrics

An introduction to some of the simpler mathematical models of economic theory and to estimates based upon them. Both aggregative and micro-economic models will be considered. Attention will be divided between formal aspects of the models and estimating procedure. Students will be assumed to have an adequate knowledge of elementary calculus and simpler algebra, but other mathematical tools will be developed as they are needed.
Prerequisite: Economics 200 and 220: Mathematics 130 or 100; and the permission of the instructor.
Evening Division: 1965-66 (lectures three hours per week).
J. Kuiper

Economics 415, History of Economic Thought

The principal developments in economic theory and doctrine especially during the nineteenth century. The principal theorists and the influential popular writers of the period. The relation of economic theory and doctrine to contemporaneous social, political, and philosophical ideas and to economic and political events.
Prerequisite: Economics 200 and the permission of the instructor.
Evening Division: 1965-66 (lectures and seminars two hours a week).
H. S. Gordon

Economics 430, Industrial Organization and Public Policy

An analysis of the organization of Canadian industry, with reference to associated U.S. industry where necessary. A few representative industries are examined in some detail. Price theory is used to distinguish economic from institutional factors affecting the structure of the economy. Emphasis is laid upon public policies which affect intentionally or otherwise, the organization and behaviour of industry, e.g., public utility regulation, control of restrictive practices, commercial policy, and price supports.
Prerequisite: Economics 200.
Evening Division: 1965-66 (lectures and seminars two hours a week).

Economics 440, Public Finance

A discussion of the theory of public finance, and an examination of several empirical attempts to quantify the theory. Some topics of current interest concerning the public sector in the Canadian economy are examined in the light of the theory and empirical findings.
Prerequisite: Economics 200 or 210.
Day Division: 1965-66 (lectures two hours a week).
W. I. Gillespie

Economics 445, Theories of Economic Growth

An intensive examination of selections from the contemporary literature on economic growth. Neo-Keynesian and neo-classical aggregated growth models will be compared. Some consideration of topics such as the theory of the growth of the firm, international trade and growth, and the theory of development pertaining to backward nations. Some modern quantitative analyses of economic growth in advanced countries will be examined.
Prerequisite: Economics 210.
Evening Division: 1965-66 (Seminar, two hours a week).
T. K. Rymes

Economics 450, Economic Fluctuations and Stabilization Policy

An analysis of the nature and causes of fluctuations in income, employment and prices, and related government policy. Some consideration of the problems and techniques involved in economic forecasting.
Prerequisite: Economics 210.
Day Division: 1965-66 (lectures and seminars two hours a week).
K. A. J. Hay

Economics 455, Quantitative Analysis of Economic Growth

An empirical inquiry into the process of modern economic growth. Following an introduction to the key theoretical tools, the analysis will focus upon the experience of Western Europe, Russia, and Japan. The usefulness of these tools in explaining growth will be evaluated in the light of the unique geographical and historical situation of these countries.
Prerequisite: Economics 210, 220.
Not offered, 1965-66.

Economics 460, International Trade

An examination of the theory of international trade and payments and its applications. The current body of theory and its historical development are discussed, as are a number of attempts to verify and quantify the theory. A number of present day problems, policies, and institutions are examined in the light of the theory and empirical findings.
Prerequisite: Economics 200 and 210.
Day Division: 1965-66 (lectures and seminars two hours a week).
S. F. Kaliski

Economics 470, Comparative Political Economy

A discussion of the relationship between ideology, economic theory, and actual organization in the principal contemporary economics. The course includes a comparative study of the origin, structure, and operation of the economic institutions of the United States and Canada, the Soviet Union, the United Kingdom, and other countries.
Prerequisite: Economics 200.
Day Division: 1965-66 (lectures two hours a week).
R. Carson

Economics 490, Tutorial in Modern Classics

An honours student will be expected, usually in his final year, to read a group of original works selected in consultation with a member of the Department assigned as tutor. The student will meet regularly with his tutor to discuss his readings and to read papers based upon it.
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually (tutorial hours arranged).
E. U. Choudhri

Economics 492, Tutorial in Economics

An additional tutorial in economics may be taken subsequent to or concurrently with Economics 490. [1965-66—Research Seminar in Urban Economics].
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually.
N. H. Lithwick, G. Paquet

Economics 498, Honours Essay

A student taking honours in economics must write an honours essay during his final year. This essay will count for one course credit.
Prerequisite: Permission of the Chairman of the Department.

Economics 500, Advanced Economic Theory

Day Division: 1965-66 (seminars two hours a week).
E. U. Choudhri, T. K. Rymes

Economics 530 (510), Applied Economics

Evening Division: 1965-66.
S. F. Kaliski, D. McDougall

Economics 599, M.A. Thesis

Engineering

Professor, Dean of Engineering	John Ruptash
Professors	W. H. Bowes, M. A. Gullen, D. A. J. Millar
Associate Professors	D. A. George, W. Wright
Assistant Professors	G. W. Bigg, F. W. Black, N. M. Brice, M. A. Copeland, G. D. Cormack, J. M. Forrest, J. A. Goldak, R. C. G. Haas, W. M. Mansour, K. Van Dalen (on leave of absence, 1965-66)
Lecturer	R. W. Cockfield
Sessional Lecturers	D. W. Brooks, G. D. Campbell, D. M. Caughey, M. S. Chappell, E. P. Cockshutt, D. C. Coll, E. H. Dudgeon, D. G. Gould, C. D. Hall, G. J. Klein, P. Mandl, R. F. Meyer, D. F. Page, W. T. Rainbird, H. W. Smith, N. B. Tucker

Undergraduate Studies

Candidates for the Bachelor of Engineering degree are required to complete a program of study covering four years after Senior Matriculation. The admission requirements and programs of study for each of the four years are outlined on pp. 56-60.

Engineering 100, Engineering Drawing

Selection and use of instruments; lettering; applied geometry; orthographic projection; freehand and instrument drawing; auxiliary and oblique views; sections and conventions; pictorial sketching and drawing including isometric, oblique and perspective; dimensions and notes, including precision and limit dimensions; screw threads; fasteners; use of piping and welding symbols; detail and assembly drawings; elements of structural drawings; descriptive geometry including point, line, plane problems, curved and warped surfaces, intersections and developments; use of reference books, handbooks and catalogues; introduction to simplified practice in engineering drawing.
Lectures 1 hour a week, both terms.
Laboratory 5 hours a week, both terms.
Texts: French and Vierck, Engineering Drawing, 9th edition.
Wellman, Technical Descriptive Geometry, 2nd edition.

Engineering 105, Surveying

Surveying principles and practice: measurements of distance, differences in elevation, angles and directions; theory, use and adjustments of principal surveying instruments; theory of errors and weighted measurements; engineering surveys; profiles, cross sections, earthwork, horizontal and vertical curves; use of rectangular co-ordinates in surveying; area computations by surveying methods; principles of aerial photogrammetry.
Lectures 2 hours a week, first term.
Text: Davis and Foote, Surveying, 4th Edition.
R. C. G. Haas

Engineering 106, Surveying Field Work

Precision chaining, precision and construction levelling, contour maps by stadia, traverse measurements, plan and profile of a city street, calculating and staking of a circular curve, slope stakes and grades, drawing plans and profiles.
Two and one-half weeks at the end of second term.
D. W. Brooks

Engineering 110, Mechanics I

Composition and resolution of forces and force systems; principles of equilibrium; analytical and graphic determination of forces in simple frame structures; suspended cables; center of gravity and centroids; friction.
Lectures 3 hours a week, second term.
Text: Langhaar and Boresi, Engineering Mechanics.
W. H. Bowes

Engineering 211, Mechanics II

Three-dimensional theory of statics; work; virtual work; stable equilibrium; kinematics and dynamics of a particle; momentum principles; kinematics and dynamics of rigid bodies; principles of work and energy.
Lectures 2 hours a week, both terms.
Problem analysis 3 hours alternate weeks, second term.
Text: Langhaar and Boresi, Engineering Mechanics.
Reference: Beer and Johnston, Mechanics for Engineers.
G. W. Bigg

Engineering 220, Mechanics of Materials I

Stress; strain; factor of safety; Hooke's Law for normal and shearing stresses; Poisson's ratio; torsion of circular, rectangular and thin-walled members; membrane analogy for torsion; stress concentrations; shear force and bending moment diagrams; flexural and shear stresses in beams; shear in I-beams; deflection of beams by double integration and moment area: combined axial and bending stresses: plane stress and strain; Mohr's circle; principal stresses and strains; thin-walled pressure vessels; introduction to electrical resistance strain gauges.
Lectures 3 hours a week, first term.
Problem analysis and laboratory 3 hours a week, first term.
Text: Popov, Mechanics of Materials.
Reference: Higdon, Olsen and Stiles, Mechanics of Materials.

Engineering 265, Introduction to Computer Programming

The concept of a data processing program. The stored program. Introduction to the 1620 Data Processing System; machine organization; memory, instruction and field addresses. Machine language programming; instruction format, input/output, arithmetic and control operations. Decisions, loops and branches. Flow Charts. Automatic coding systems. Programming with the FORTRAN language. Laboratory sessions are devoted to demonstrations and programming exercises.
Lectures 1 hour a week, both terms.
Laboratory 1 hour a week, both terms.
Text: Leeson and Dimitry, Basic Programming Concepts and the I.B.M. 1620 Computer.
W. H. Bowes

Engineering 270, Elements of Materials Science

Engineering properties; mechanical, electrical, chemical, thermal. Molecular structure of materials; crystal structure, amorphous structure; effect on properties. Metals: crystallography; grains and grain boundaries, deformation, work hardening, recrystallization; solid solutions, phases and phase diagrams, precipitation; allotropism, heat treatment. Ceramics; crystalline; amorphous; cermets. Organics; molecular structures; polymerization and effect on properties. Effects of service on material; stress, strain, plasticity, creep, fatigue, fracture; electric, magnetic and radiation effects. Material selection in design.
Lectures 2 hours a week, second term.
Laboratory 3 hours alternate weeks, second term.
Text: Van Vlack, Elements of Materials Science.
References: Wulff, Taylor and Shaler, Metallurgy for Engineers.
Kinney, Engineering Properties and Applications of Plastics.
Norton, Elements of Ceramics.
J. A. Goldak

Engineering 312, Mechanics of Machines I

Introduction to mechanisms; simple, compound and epicyclic gear trains; static and dynamic balance—rotors and reciprocating engines; mechanical vibration—free and forced vibration, damping, systems having one and two degrees of freedom.
Lectures 2 hours a week, first term.
Text: Mabie and Ocvirk, Dynamics of Machinery.
References: Timoshenko, Vibration Problems in Engineering.
Ham, Crane and Rogers, Mechanics of Machinery.
W. H. Bowes

Engineering 321, Mechanics of Materials II

Statically indeterminate problems in tension and compression, thermal stresses, concentrically and eccentrically loaded connections with rivets, bolts or welds in shear or tension; plastic bending of beams, beams of two materials, unsymmetrical bending, shear center; deflection due to unsymmetrical bending, deflection due to shear; introduction to strain energy; statically indeterminate problems in bending by the method of superposition, continuous beams with elastic supports or settlement of supports; the Euler formula for columns, effective column length, the tangent modulus formula, the secant formula, design formulae for columns; lateral buckling of beams; design for combined compression and bending; triaxial stresses, failure theories; the effect of high and low temperatures on metals; fatigue.
Lectures 2 hours a week, second term.
Problem analysis and laboratory 3 hours a week, second term.
Text: Timoshenko and Young, Elements of Strength of Materials.
Reference: Popov, Mechanics of Materials.
W. Wright

Engineering 330, Fluid Mechanics

Fundamental concepts; properties of fluids; fluid statics; fluids in relative equilibrium; fundamental equations for steady one-dimensional nonviscous incompressible flow; selected applications; dimensional analysis, dynamic similarity; laminar flow, turbulent flow, boundary layer, skin friction, and drag estimation; pipe line problems; open channel flow; one-dimensional steady isentropic flow, shock waves; elements of two-dimensional steady non viscous incompressible flow.
Lectures 2 hours a week, both terms.
Laboratory 3 hours alternate weeks, both terms.
References: Pao, Fluid Mechanics.
Vennard, Elementary Fluid Mechanics.
F. W. Black

Engineering 340, Thermodynamics

Basic concepts of heat, work, temperature, property, state, system, control volume. The First Law and steady flow energy equations and applications. Properties of pure substances, phase diagrams. The Perfect Gas Laws and relations. The Second Law and its corollaries; entropy and availability. Introduction to power and refrigeration cycles. Properties of mixtures, psychrometry.
Lectures 3 hours a week, first term.
Problem analysis and laboratory 3 hours a week, first term.
Text: Jones and Hawkins, Engineering Thermodynamics.
D. A. J. Millar and M. S. Chappell

Engineering 341, Introduction to Heat Transfer

Analytical, analog and numerical methods of determining temperature distribution and heat flow in regions with steady-state heat conduction in one and two dimensions. An introduction to non-steady-state heat conduction problems. Heat exchange by radiation between black and grey surfaces; solar radiation. Heat transfer to fluids flowing through ducts. Free and forced convection at cylindrical and plane surfaces. Boiling and condensation. The lectures are supplemented by laboratory experiments and problems.
Lectures 2 hours a week, second term.
Laboratory 3 hours alternate weeks, second term.
Text: Kreith, Principles of Heat Transfer.

Engineering 350, Fundamentals of Electric Circuits and Machines

The course consists of two parts.
The first term is devoted to an introduction to the theory of linear passive networks. Sinusoidal steady-state analysis using phasors and j-notation; the parallel-resonant tank; bridges; frequency response, Bode and Nyquist plots. Loop and node analysis; superposition; the indefinite admittance matrix; Thevenin's and Norton's theorems. Laplace transforms; transient response and pole-zero plots. The second term is devoted to electromechanical energy conversion and rotating electrical machines. Topics include energy conversion in simple devices, solenoids, reluctance motors; study of d-c, induction, and synchronous machines and their terminal characteristics; elements of 3-phase circuits.
Lectures 3 hours a week, both terms.
Laboratory and problem analysis 3 hours a week, first term.
Laboratory 3 hours alternate weeks, second term.
Texts: Walsh and Miller, Introductory Electric Circuits.
Pearson, Basic Energy Converters.
M. A. Copeland

Engineering 357, Electronics I

Diodes and diode circuits. Vacuum tubes and their equivalent circuits. Transistors and their equivalent circuits. Small signal amplifiers. Oscillators. Large signal circuits. Survey of the principal electronic systems.
Lectures 3 hours a week, second term.
Laboratory 3 hours alternate weeks, second term.
Text: Ryder, Electronic Fundamentals and Applications, 3rd Edition.
D. A. George

Engineering 366, Computer Applications

Review of data processing, advanced FORTRAN programming. Selected topics in numerical methods of analysis, including iterative solutions of algebraic and transcendental equations and systems of equations, polynomial curve fitting by difference and least square methods, numerical differentiation and integration, and the solution of ordinary differential equations and simple partial differential equations. A major part of the course consists of the analysis and solution by the student of one substantial engineering problem using the 1620 Data Processing System.
Lectures 3 hours a week, first term.
Laboratory 3 hours alternate weeks, first term.
Text: Wooldridge, Introduction to Computing.
References: Stanton, Numerical Methods for Science and Engineering.
Salvadori and Baron, Numerical Methods in Engineering.
W. M. Mansour

Engineering 401, Mechanical Analysis and Design

Stress analysis; design factors; properties of materials; stress concentration, notch sensitivity and fatigue; curved beams; columns with axial and transverse loading; power screws; screw fastenings and connections subject to variable loads; shafts; funicular polygon method of determining the elastic curve and critical speed of shafts, general case; springs; journal and plane bearings; rolling bearings; belt and chain drives; spur, helical, bevel, hypoid and worm gearing; couplings, brakes and clutches.
Lectures 2 hours a week, both terms.
Problem analysis 3 hours alternate weeks, both terms.
Text: Faires, Design of Machine Elements.
References: Merritt, Gears.
Shigley, Machine Design.
G. J. Klein

Engineering 413, Mechanics of Machines II

Cams, gear profile, theory; helical, bevel and worm gears; velocity and acceleration of machine elements; instantaneous centers; forces in machine elements due to external loads and inertia of elements.
Lectures 2 hours a week, first term.
Problem analysis 3 hours alternate weeks, first term.
Text: Mabie and Ocvirk, Dynamics of Machinery.
Reference: Shigley, Theory of Machines.
G. W. Bigg

Engineering 414, Vibration Analysis

Vibration transmission and isolation, isolation materials, energy absorption. Matrix methods for many degree-of-freedom systems. Holzer's and Porter's method for torsional systems. Electrical analogue and mobility methods. Vibration measurement and analysis. Nodal analysis for bars and plates.
Lectures 2 hours a week, first term.
Laboratory 3 hours alternate weeks, second term.
References: A. H. Church, Mechanical Vibrations.
Timoshenko, Vibration Problems in Engineering.
W. M. Mansour

Engineering 422, Structural Analysis

Review of plane statics; advanced analysis of statically determinate plane trusses; moving loads and influence lines; statically determinate space structures; guyed towers; analysis of elastic systems by energy methods; deflection of trusses by graphical and analytical methods; statically indeterminate pin-jointed trusses; analysis of rigid frames with prismatic or haunched members by slope deflection and moment distribution; arches; analysis or rigid frames for plastic design; elementary treatment of elastic stability of columns, beams and plates.
Lectures 3 hours a week, first term; 2 hours a week, second term.
Laboratory 3 hours alternate weeks, both terms.
Text: Timoshenko and Young, Theory of Structures.
Reference: Norris and Wilbur, Elementary Structural Analysis.
W. Wright

Engineering 423, Reinforced Concrete

Properties of concrete; mix design and use of admixtures; curing requirements; shrinkage; creep and temperature effects; ultimate strength and working stress analysis and design of rectangular beams with tension and compression reinforcement and T beams; diagonal tension; bond; design of web reinforcement; two way and flat slabs; yield-line theory for slabs; concentrically and eccentrically loaded columns; footings; introduction to prestressed concrete.
Lectures 3 hours a week, second term.
Problem analysis and laboratory 3 hours a week, second term.
Text: Winter, Urquhart, O'Rourke and Nilson, Design of Concrete Structures.
References: Cernica, Fundamentals of Reinforced Concrete.
A.C.I. Building Code Requirements for Reinforced Concrete.
R. C. G. Haas

Engineering 424, Soil Mechanics

Identification and classification; soil structure and clay mineralogy; void ratio, water content and unit weight relationships; compaction; neutral and effective stresses; permeability; flow nets; one-dimensional consolidation; stress distribution; shear strength; stability of slopes; earth pressure.
Lectures 3 hours a week, first term.
Laboratory 3 hours alternate weeks, first term.
Text: Terzaghi and Peck, Soil Mechanics in Engineering Practice.
References: Taylor, Fundamentals of Soil Mechanics.
Bishop and Henkel, The Measurement of Soil Properties in the Triaxial Test.
J. M. Forrest

Engineering 425, Design of Structural Components

Determination of loads; factors of safety; properties of structural steels; the design of axially loaded tension and compression members; design of rolled steel shapes in flexure; design of simple and eccentric, welded and bolted connections; design of welded and bolted splices; design of members with combined compression and flexure; design of moment resisting connections, base plates.
Lectures 3 hours a week, first term.
Problem Analysis 3 hours alternate weeks, first term.
Text: Gaylord and Gaylord, Design of Steel Structures.
Reference: C.I.S.C. Steel Construction Series.
R. W. Cockfield

Engineering 426, Design of Steel Structures

Structural loads and design procedures; design of plate girders, built-up compression members and trusses, rigid frames; design of bridges, single and multi-storey buildings; plastic design; economic considerations and cost estimates.
Lectures 2 hours a week, second term.
Problem Analysis 3 hours alternate weeks, second term.
Text: Gaylord and Gaylord, Design of Steel Structures.
References: C.I.S.C. Steel Construction Series.
National Building Code of Canada.
Canadian Standards Association—Highway Bridges (S6).
R. W. Cockfield

Engineering 428, Foundation Engineering

Site investigation; bearing capacity; settlement; drainage; pile foundations; stability of retaining walls, sheet piling walls, braced cofferdams and cellular cofferdams.
Lectures 2 hours a week, second term.
Problem analysis 3 hours alternate weeks, second term.
Text: Teng, Foundation Design.
References: Terzaghi and Peck, Soil Mechanics in Engineering Practice.
Peck, Hanson and Thornburn, Foundation Engineering.
J. M. Forrest

Engineering 429, Highway Engineering

Highway planning, economics and finance; highway location and geometric design; traffic engineering; highway drainage and subgrade structure; structural analysis and design of rigid and flexible pavements; mineral aggregates; bituminous mix design; principles of frost action and applications to highway design.
Lectures 2 hours a week, first term.
Laboratory and problem analysis 3 hours alternate weeks, first term.
Text: Oglesby and Hewes, Highway Engineering.
References: Ritler and Paquette, Highway Engineering.
Woods, Highway Engineering Handbook.
Yoder, Principles of Pavement Design.
R. C. G. Haas

Engineering 431, Hydrology

Hydrologic cycle and precipitation; analysis of precipitation data by statistical methods; subsurface water; stream flow; unit hydrograph method for flood runoff; S-curve hydrograph; infiltration capacity curves and methods of determining net storm rain; hydraulics of wells; Modified Puls method of reservoir routing; Muskingum method of channel routing; applications of regime equations to mobile boundary hydraulics; applications of hydrologic methods to reservoir design and storm drain design.
Lectures 2 hours a week, first term.
Laboratory 3 hours alternate weeks, first term.
References: Butler, Engineering Hydrology.
Linsley and Franzini, Water-Resources Engineering.
Wisler and Brater, Hydrology.
Linsley, Kohler and Paulhus, Hydrology for Engineers.
Blench, Regime Behaviour of Canals and Rivers.

Engineering 432, Fluid Dynamics

Foundations of fluid dynamics, two-dimensional steady nonviscous incompressible flow, isentropic flow, normal and oblique shock waves, adiabatic flow in nozzles and diffusers, methods of measurement in high speed flow, viscous flows and boundary layer theory, diabatic flow. The lectures are supplemented by assigned problems.
Lectures 3 hours a week, first term.
References: Dommasch, Principles of Aerodynamics.
Leipmann and Roshko, Elements of Gas Dynamics.
Kuethe and Schetzer, Foundations of Aerodynamics.
Shapiro, Dynamics and Thermodynamics of Compressible Fluid Flow, Vol. 1.
D. A. J. Millar

Engineering 435, Hydraulic Machinery

Uniform flow in a pressure conduit; velocity distribution; head losses; pipe networks; measurement of flow; water hammer; pressures on pipes surge tanks; inverted syphons; impulse and reaction turbines; cavitation; centrifugal, reciprocating, rotating and jet pumps.

Lectures 2 hours a week, first term.

Laboratory 3 hours alternate weeks, first term.

References: Morris, Applied Hydraulics in Engineering.

Linsley and Franzini, Elements of Hydraulic Engineering.

Rouse, Engineering Hydraulics.

Engineering 436, Hydraulic Structures

Hydrostatics; uniform flow in open channels; normal depth; non-uniform flow; energy regimes; flow transitions; hydraulic jump, back water curves; weirs; Venturi and Parshall flumes; dams, reservoirs; spillways, canals; flumes; gates; erosion and sediment transport, sewers and appurtenances.

Lectures 2 hours a week, second term.

Problem analysis and laboratory 3 hours alternate weeks, second term.

References: Morris, Applied Hydraulics in Engineering.

Linsley and Franzini, Elements of Hydraulic Engineering.

Rouse, Engineering Hydraulics.

Davis, Handbook of Applied Hydraulics.

R. W. Cockfield

Engineering 437, Mechanics of Flight

Introduction to mechanics of flight; elements of theoretical and experimental aerodynamics; aerodynamic characteristics of airfoils and wings at low and high speeds, airplane drag estimation; performance characteristics of propulsive systems; airplane performance analysis including take-off, landing, rate of climb, maximum speed, range, endurance, etc.; static stability and control problems and analysis.

Prerequisite: Engineering 330 or equivalent.

Lectures 3 hours a week, first term.

References: Dommasch, Sherby and Connolly, Airplane Aerodynamics.

Carrol, The Aerodynamics of Powered Flight.

J. Ruptash

Engineering 442, Applied Thermodynamics

Properties of pure substances and their functions. Non-reactive mixtures and psychrometry. Reactive mixtures, combustion. Heat engine cycles and plants. Vapor cycles, steam, mercury and binary power plants; compression and absorption refrigeration, distillation. Gas cycles. Internal combustion engines, gas turbines, air cycle refrigerators. Turbomachinery; torque and energy relations, types of machines. Turbomachine characteristics and performance. Application of engineering analysis to thermodynamic systems.

Lectures 3 hours a week, both terms.

Laboratory 3 hours, alternate weeks, both terms.

References: Soo, Thermodynamics of Engineering Science.

Shepherd, Principles of Turbomachines.

Jones and Hawkins, Engineering Thermodynamics.

Lewis, Gas Power Dynamics.

F. W. Black

Engineering 443, Energy Conversion

An assessment of the world's foreseeable energy requirements and presently-known methods of energy utilization. Principles of operation of uranium-fuelled nuclear reactors, proposed deuterium-filled reactors, thermoelectric power generators, thermionic power generators, fuel cells, magneto-plasmadynamic power generators and solar cells.
Lectures 3 hours a week, second term.
Laboratory 3 hours alternate weeks, second term.
References: Chang, Energy Conversion.
Littler and Raffle, An Introduction to Reactor Physics.
Rose and Clark, Jr., Plasmas and Controlled Fusion.
G. D. Cormack

Engineering 447, Refrigeration and Air Conditioning

Comfort. Environmental demands for residential, commercial and industrial systems. Methods of altering and controlling environment. Air distribution. Refrigeration methods, equipment and controls. Integrated year-round air-conditioning and heating systems; heat pumps. Cooling load and air-conditioning calculations. Thermal radiation control. Component matching. System analysis and design.
Lectures 2 hours a week, first term.
Problem analysis 3 hours alternate weeks, first term.
Text: Stoecker, Refrigeration and Air-conditioning.
Reference: Carrier, Cherne, Grant and Roberts, Modern Air-conditioning, Heating and Ventilating.

Engineering 451, Linear Systems

Introduction to linear systems analysis using complex variables and Laplace transforms. Complete response of linear networks to excitation by arbitrary wave forms or pulses. Introduction to signal flow graphs, network synthesis and filter design. Fourier transforms and spectrum concept, theorems. Convolution and correlation. Moments, the uncertainty principle. Modulation, sampling, noise in linear circuits.
Lectures 3 hours a week, first term; 2 hours a week, second term.
References: Bohn, The Transform Analysis of Linear Systems.
Javid and Brenner, Analysis, Transmission and Filtering of Signals.
G. D. Cormack and N. M. Brice

Engineering 452, Control Systems and Instrumentation

Transfer functions, block diagram algebra, stability, steady state errors, types of control systems, root-locus method, frequency response, Bode construction, Nichol's charts, Nyquist stability criterion; servomechanism equalisation; modes of control. Study of basic pneumatic and hydraulic control loops for level, position, speed, air conditioning and inertial guidance controls with emphasis on the response of the transducers and instruments' response. Laboratory activities will include the design and synthesis of control loops and components.
Lectures 2 hours a week, second term.
Laboratory 3 hours a week, second term.
References: Welbourn, Essentials of Control Theory for Mechanical Engineers.
Raven, Automatic Control Engineering.
W. M. Mansour

Engineering 453, Electric Transmission and Radiation

Theory of transmission of electromagnetic waves along linear conductors: basic differential equations and their solution, line constants, transmission parameters, steady state and transient conditions. Application of transmission lines; power lines, telephone lines, radio frequency lines, wave guides. Transition from guided to radiated wave propagation. General theory of antennas, near and far fields, reciprocity, characteristics of linear antennae and horn radiators, arrays, apertures and reflectors. Transmission formulae for free space propagation. Reflection, refraction, diffraction and scattering of radio waves.
Lectures 3 hours a week, second term.
Laboratory 3 hours a week, second term.
Texts: Skilling, Electric Transmission Lines.
Jordan, Electromagnetic Waves and Radiating Systems.
References: Kimbark, Electrical Transmission of Power and Signals.
Kraus, Antennas.
N. M. Brice

Engineering 454, Electromagnetic Fields

Vector analysis, Coulomb's law, Gauss's law, divergence, potential, gradient, vector operator "del", electrostatic fields, field mapping by experimental methods and by iteration and relaxation, Poisson and Laplace equations, magnetostatic fields, curl, Stokes' theorem, forces in magnetic fields, time-varying fields, Maxwell's equations in point and integral form. Introduction to plane waves.
Lectures 3 hours a week, first term.
Text: Jordan, Electromagnetic Waves and Radiating Systems
Reference: Hayt, Engineering Electromagnetics.
N. M. Brice

Engineering 455, Feedback Control Systems

Review of Laplace Transformation methods. Dynamics of control system components. Objectives of automatic control. Block diagrams. Complex plane techniques. Stability. Root locus. Compensation. Frequency response methods.
Lectures 3 hours a week, first term.
Problem analysis 3 hours alternate weeks, first term.
Text: Clark, Introduction to Automatic Control Systems.
G. D. Cormack

Engineering 456, Feedback Control Laboratory

Experimental determination of system characteristics by step, a.c. steady state and general excitation testing. Compensation design. A.C. Systems. Component characteristics and selection. Effects of common nonlinearities. Laboratory work involves the use of the analogue computer, measurements on d.c. and a.c. control systems, and system design. Electrical, electromechanical and mechanical control systems may be studied.
Lectures 1 hour a week, second term.
Laboratory 3 hours a week, second term.
Reference: Clark, Introduction to Automatic Control Systems.
D. A. George

Engineering 458, Electronics II

Diode gates, AND, OR, NAND and NOR. Voltage sweeps; linearity and synchronization. Multivibrators, blocking oscillators, power converters. The properties of linear active quadripoles, input and output admittance, stability criteria, optimum power gain and unilateralisation. Small signal narrow-band amplifiers. Large signal amplifiers, audio and radio-frequency. Oscillators. Modulation and modulating systems. Frequency changing, limiting, demodulation.
Lectures 2 hours a week, first term; 3 hours a week, second term.
Laboratory 3 hours a week, first term, 3 hours alternate weeks, second term.
Text: Ryder, Electronic Fundamentals and Applications, 3rd Edition.
References: Cote and Oakes, Linear Vacuum Tube and Transistor Circuits.
Schwartz, Information Transmission, Modulation and Noise.
M. A. Gullen

Engineering 462, Electrical Machines

Coupled circuit theory of rotating electric machinery is developed. Two-axis d-c machines, servomotors, synchros. Application to feedback systems. Kron's generalized theory of rotating electrical machinery is introduced using matrix algebra.
Lectures 2 hours a week, second term.
References: Adkins, The General Theory of Electrical Machines.
Fitzgerald and Kingsley, Electrical Machinery.
M. A. Copeland

Engineering 463, Advanced Electric Machines

Coupled circuit theory of synchronous machines and induction machines. The major part of the course deals with the transient behaviour of round rotor and salient-pole synchronous machines. Transient and sub-transient reactances. Symmetrical and unsymmetrical short-circuits. Electromechanical transients and stability of synchronous machines.
Lectures 2 hours a week, second term.
Laboratory 3 hours alternate weeks, second term.
References: Lewis, The Principles of Synchronous Machines.
Concordia, Synchronous Machines.

Engineering 464, Electric Power Systems

Solution of networks, performance and control of synchronous machines, transmission line theory, transformers, cables, switchgear, protection, short-circuits, faults, network analyzers, steady-state stability, transient stability.
Lectures 3 hours a week, first term.
Reference: Stevenson, Power system Analysis.
M. A. Copeland

Engineering 466, Switching Circuits

Set theory, propositional calculus, Boolean algebra. Analysis and synthesis of combinational circuits, The Karnaugh Map, minimization methods. Multiple output networks. Half and full adders. Codes. NAND, NOR, logic. Introduction to sequential circuits; analysis, races and hazards. Synthesis of asynchronous sequential circuits, primitive and merge flow tables, secondary assignment.
Lectures 3 hours a week, first term.
References: Maley and Earle, Logic Design of Transistor Digital Computers.
Caldwell, Switching Circuits and Logical Design.
M. A. Gullen

Engineering 471, Applied Materials Science

Engineering properties of materials: physical, electrical, chemical. Typical and special service requirements: temperature, radiation, corrosion, vibration. Selection of materials for service: high temperature alloys, ceramics and cermets; cryogenic materials; radiation resistant and low capture cross-section materials; corrosion-resistant materials; fatigue resistant materials. Forming, fabrication and bonding of engineering materials. Testing and inspection of materials and structures.
Lectures 2 hours a week, first term.
Laboratory 3 hours alternate weeks, first term.
Text: Samans, Metallic Materials in Engineering.
Reference: Van Vlack, Elements of Materials Science.
J. A. Goldak

Engineering 475, Electrical and Magnetic Properties of Materials

Investigation of dielectric, magnetic and conductive properties of materials from a microscopic point of view. Review of atomic physics, dielectric constants of solids, liquids and gases; ferroelectricity; spontaneous polarization; behaviour of dielectrics in alternating fields; dia-, para-, antiferro-, and ferro-magnetism. mechanism of conduction in metals and semi-conductors; intrinsic, p-type, and n-type semiconductors; junction rectifiers and transistors; avalanche processes.
Lectures 2 hours a week, first term.
Laboratory 3 hours alternate weeks, first term.
References: Dekker, Electrical Engineering Materials.
Von Hippel, Dielectric Materials and Applications.
Smit and Wijn, Ferrites
J. A. Goldak

Engineering 497, Engineering Project

As a part of the fourth year program, each student is required to select and complete a major project in engineering analysis, design, development or research. The objective is to provide an opportunity to develop initiative, self reliance, creative ability, and engineering judgement. The results must be submitted in a comprehensive report with appropriate drawings, charts, bibliography, etc. Each student is expected to devote at least 200 hours to his engineering project.
Members of the Faculty

Graduate Studies

The Faculty of Engineering offers courses of graduate study leading to the M.Eng. and Ph.D. degrees in the fields of Aeronautical Engineering, Civil Engineering, Electrical Engineering and Mechanical Engineering. The regulations governing graduate studies are outlined on pp. 61-64 and 65-68.

Engineering 500, Aerodynamics

Derivation and application of the fundamental equations of nonviscous incompressible and compressible flow, significance and solution of two- and three-dimensional potential flow problems, low speed airfoil theories, wing lifting-line theory, two-dimensional isentropic flow, normal and oblique shock waves, supersonic nozzle contour design, supersonic nozzle and diffuser flow analysis, first- and second-order supersonic airfoil theory, small perturbation theory and similarity rules. The lectures are supplemented by assigned problems.
Lectures 3 hours a week, both terms.
References: Liepmann and Roshko, Elements of Gas Dynamics.
Kuethe and Schetzer, Foundations of Aerodynamics.
Shapiro, Dynamics and Thermodynamics of Compressible Fluid Flow.
Sears, General Theory of High Speed Aerodynamics.
J. Ruptash

Engineering 501, Theory of Viscous Flow

Fundamental concepts of viscous flow; derivation of Navier-Stokes equations; Prandtl's boundary layer approximation; momentum integral methods; incompressible and compressible laminar and turbulent boundary layers; stability; transition; turbulent flow; flow separation; transformation methods; shock wave-boundary layer interaction; semi-empirical solution of turbulent skin friction and heat-transfer problems. (Half course).
Prerequisite: Engineering 500 or equivalent.
Lectures 3 hours a week, first term.
Reference: Schlichting, Boundary Layer Theory.
W. T. Rainbird

Engineering 502, Hypersonic Flow

One dimensional unsteady compressible flow. Hypersonic similarity; hypersonic small disturbance theory and applications; tangent-wedge and tangent-cone approximations; blunt body problems; heat transfer at hypersonic speeds; shock wave—boundary layer interactions; real gas effects; use of the Mollier diagram; dissociation, ionization and relaxation effects; frozen and equilibrium solutions for a real gas; experimental simulation of hypersonic flows. (Half Course).
Prerequisite: Engineering 500 or equivalent.
Lectures 3 hours a week, second term.
References: Hayes and Probstein, Hypersonic Flow Theory.
Emmons, Fundamentals of Gas Dynamics.
Truitt, Hypersonic Aerodynamics.
R. F. Meyer

Engineering 505, Wing Theory

Aerodynamic characteristics of wings at subsonic speeds: modified lifting-line and lifting-surface theories; Weissinger, Falkner and Multhopp methods; low aspect ratio wing theory. Supersonic wing theory: conical method; source distribution method with applications to rectangular, sweptback and triangular plan forms. (Half Course).
Prerequisite: Engineering 500 or equivalent.
Lectures 3 hours a week, first term.
References: Robinson and Laurmann, Wing Theory.
Donovan and Lawrence, Aerodynamic Components of Aircraft at High Speeds.
P. Mandl

Engineering 508, Experimental Methods in Aeronautics

Measurement errors, random and systematic errors, mean probable errors, method of least squares. Fundamental methods of measurement: displacement, velocity and acceleration in solid, fluid and gaseous systems. Measurement of temperature, pressure, density, density gradient, flow direction, Mach number, fluid surface friction and heat transfer. Measurement of forces and moments. Data recording. Principles and design of experimental test facilities. (Half Course).
Lectures 3 hours a week, first term.
Reference: Landenburg, Lewis, Pease and Taylor, Physical Measurements in Gas Dynamics and Combustion.
N. B. Tucker

Engineering 512, Dynamics of Flight

Development of the general equations of motion of the airplane and its control systems. Small disturbance theory. Representation of aerodynamic effects by means of stability derivatives. Longitudinal and lateral stability criteria. Longitudinal and lateral modes of airplane motion. Transient motions of the airplane in response to control movement. Automatic stability and control. (Half Course).
Prerequisite: Engineering 437 or the equivalent.
Lectures 3 hours a week, second term.
References: Etkin, Dynamics of Flight.
Kolk, Modern Flight Dynamics.
D. G. Gould

Engineering 515, Introduction to Plasma Dynamics

Introduction to plasmas; motions of singly charged particles, orbit theory; plasma oscillations; electromagnetic wave propagation in cold multicomponent plasmas; applications to the ionosphere; Boltzmann equation; warm plasmas; Landau damping. (Half Course).
Lectures 3 hours a week, first term.
References: Spitzer, Physics of Fully Ionized Gases.
Stix, The Theory of Plasma Waves.
N. M. Brice

Engineering 516, Magnetogasdynamics

Electromagnetic fields in moving coordinate systems. Equations for plasmas in magnetic fields; MHD generators; flux transport; plasma accelerators; magneto-hydrodynamic waves; high velocity shock waves; magnetohydrodynamic shocks. Production of plasmas, diagnostics of plasmas, current research. (Half Course).
Lectures 3 hours a week, second term.
References: Rose and Clarke, Plasmas and Controlled Fusion.
Thompson, An Introduction to Plasma Physics.
G. D. Cormack

Engineering 520, Theory of Elasticity

Stress-strain relationships. Plane stress and plane strain. Two dimensional problems in rectangular and polar coordinates. Strain energy methods. Analysis of stress and strain in three dimensions. General theorems. Three dimensional problems. Thermal stresses. Lectures 3 hours a week, both terms.
References: Timoshenko and Goodier, Theory of Elasticity.
Wang, Applied Elasticity.
W. H. Bowes

Engineering 521, Theory of Plasticity

Yield criteria and associated flow rules. Limit analysis. Applications to deformation, residual stress and fracture in bars, beams and tubes. (Half Course).
Lectures 3 hours a week, second term.
Reference: Hill, Mathematical Theory of Plasticity.
Not offered, 1965-66.

Engineering 522, Theory of Plates and Shells

Bending of rectangular and circular plates. Deformation of shells without bending. Cylindrical shells. (Half Course).
Lectures 3 hours a week, first term.
Reference: Timoshenko, Theory of Plates and Shells.
W. Wright

Engineering 523, Theory of Structural Stability

Flexural buckling of columns and beam columns; the stability of frameworks; torsional buckling of columns; combined flexural and torsional buckling; buckling of plates; local buckling of columns and beams; inelastic buckling of columns, beams and plates; application of numerical methods to buckling problems. (Half Course).
Prerequisite: Engineering 525 or equivalent.
Lectures 3 hours a week, second term.
References: Timoshenko and Gere, Theory of Elastic Stability.
Bleich, Buckling Strength of Metal Structures.
G. W. Bigg

Engineering 524, Advanced Mechanics of Materials

Flow and fracture of metals; failure theories; fatigue; behaviour of metals at low and high temperatures; special problems in flexure; special problems in torsion; plates. (Half Course).
Lectures 3 hours a week, second term.
Reference: Seely and Smith, Advanced Mechanics of Materials.
J. A. Goldak

Engineering 525, Analysis of Elastic Structures

Use of the force method and the displacement method for the analysis of a variety of indeterminate structures including frames, arches and two- and three-dimensional trusses; matrix analysis of indeterminate structures; use of models; influence lines for indeterminate structures. (Half Course).
Lectures 3 hours a week, first term.
Reference: Hall and Woodhead, Frame Analysis.
W. Wright

Engineering 527, Experimental Stress Analysis

Photoelasticity: two-dimensional stress fields, models, types of polariscope, the shear difference method, relaxation solution of Laplace's equation, oblique incidence, isotropic points. Three-dimensional stress fields, frozen patterns, scattered light analysis. Formulae for photoelastic coating; photoelastic strain gauges. Gauge factors, loading effects on strain gauge bridges, balancing, cross and null balance sensitivity, calibration and temperature compensation. Models and analogues, soap film. Moire fringes, brittle lacquer, mechanical and optical strain gauges. (Half course).
Lectures 3 hours a week, first term.
References: Frocht, Photoelasticity.
Adams, Experimental Stress Analysis and Motion Measurements.
Lee, Introduction to Experimental Stress Analysis.
W. M. Mansour

Engineering 528, Advanced Reinforced Concrete

Ultimate strength and behaviour of reinforced concrete members. Current research and recent North American and European practice. Reinforced concrete members subjected to flexure, axial compression, combined flexure and axial load, combined flexure and shear; bond. (Half course).
Lectures 3 hours a week, first term.
Not offered, 1965-66.

Engineering 530a, Advanced Soil Mechanics I

Principle and application of effective stresses; pore pressure parameters, compressibility and shear strength theories for saturated and partly saturated soils; flow of water through soils: steady and transient; immediate settlement; consolidation; mineralogy and physical chemistry of soils. The lectures are supplemented by assigned problems. (Half course).
Lectures 3 hours a week, first term.
References: Terzaghi, Theoretical Soil Mechanics.
Scott, Principles of Soil Mechanics.
J. M. Forrest

Engineering 530b, Advanced Soil Mechanics II

Design and analysis of earth embankments; analysis of natural slopes and cuts; development and application of theories for predicting pore pressure changes during construction, steady seepage and drawdown; sand drains; relief wells; grouting. (Half course).
Lectures 3 hours a week, second term.
References: Sherard et al., Earth and Earth-Rock Dams.
Jumikis, Soil Mechanics.
J. M. Forrest

Engineering 532, Soil Testing and Analysis

A combined laboratory and lecture course dealing with classification tests, consolidation and settlement, shear strength, seepage, piezometers, earth pressure, sampling and seismic refraction. Selected topics will require detailed study, analysis and presentation. (Half course).
Laboratory and lectures 6 hours a week, second term.
References: Leonards, et al., Foundation Engineering.
Bishop and Henkel, Measurement of Soil Properties in the Triaxial Test.
Not offered, 1965-66.

Engineering 533, Pavement Design

Characterization of highway and airport traffic loads; stresses and load distribution in single and multi-layer flexible and rigid pavements; pavement behaviour under static, transient and repeated loads; interpretation and application of strength properties of subgrade soils and paving materials; theoretical and empirical design methods for flexible and rigid highway and airport pavements; pavement performance evaluation; pavement test roads; current research developments. (Half course).
Lectures 3 hours a week, first term.
References: Yoder, Principles of Pavement Design.
Woods, Highway Engineering Handbook.
Ann Arbor International Conference on Structural Design of Asphalt Pavements.
R. C. G. Haas

Engineering 534, Transportation Planning

Modes of transportation; urban transportation and its relation to urban development; urban and rural master traffic plans; techniques of planning and estimating usage of urban transportation systems; physical, economic and administrative fundamentals. (Half course).
Lectures 3 hours a week, first term.
References: Hay, An Introduction to Transportation Engineering.
Berry, et al., The Technology of Urban Transportation.
Martin, et al., Principles and Techniques of Predicting Future Demand for Urban Area Transportation.
R. C. G. Haas and D. G. Campbell

Engineering 535, Traffic Engineering

Theory of traffic flow; volumes, speeds, interpretation of field data; characteristics of vehicles and road users; mathematical models and assignment techniques, freeway, arterial intersection and interchange design as related to operational performance; traffic control devices; design and operation of signal systems; parking studies; computer and operations research techniques. (Half course).
Lectures 3 hours a week, second term.
References: Kennedy, et al., Fundamentals of Traffic Engineering.
Highway Capacity Manual; Traffic Engineering Handbook.
Matson, et al., Traffic Engineering.
Not offered, 1965-66.

Engineering 536, Highway Materials

Physical characteristics and strength evaluation of soils and aggregates in relation to highway engineering; frost action in soils; sources, manufacture and composition of bituminous materials; evaluation of properties and characteristics of bituminous materials; soil stabilization and granulometrics. Lectures will be supplemented by laboratory work. (Half course).

Lectures 3 hours a week, second term.

References: Abraham, Asphalts and Allied Substances.

Traxler, Asphalt—Its Composition, Properties and Uses.

Not offered, 1965-66.

Engineering 540, Advanced Thermodynamics

The three laws of thermodynamics for closed and open systems; irreversibility, availability. Thermodynamic properties of pure substances; thermodynamic relations. Equations of state; kinetic theory of ideal gas; specific heats; entropy and probability. Non-ideal gases; compressibility; empirical equations of state. Thermodynamics of energy conversion; combustion, equilibrium; frozen equilibrium; fuel cells, thermo electricity. Thermodynamics of compressible fluid flow; steady and non-steady flow processes. Discussion of selected topics.

Lectures 3 hours a week, both terms.

Text: Obert, Concepts of Thermodynamics.

References: Lee, Sears and Turcotte, Statistical Thermodynamics.

Owczarek, Fundamentals of Gas Dynamics.

D. A. J. Millar

Engineering 541, Turbomachinery

Non-dimensional parameters and similarity. Energy and torque relations for rotating coordinate systems. Radial equilibrium equations. Cascades: flow, performance and testing. Axial flow turbomachines: energy relations, flow patterns, types, characteristics and design. Radial flow turbomachines: energy relations, flow patterns, types, characteristics and design. Viscous flow and boundary layer effects, skewed boundary layers and cross flows, secondary flows. Compressor surge and rotating stall. (Half Course).

Lectures 3 hours a week, second term.

References: Shepherd, Principles of Turbomachinery.

Stepanoff, Turboblowers.

Wislicenus, Fluid Mechanics of Turbomachinery.

D. A. J. Millar

Engineering 542, Gas Turbines

Ideal cycles for power and propulsion. Real cycle performance; simple cycle, compound cycle, cross-compound cycle, regenerative cycles, gas turbine plant component characteristics; compressors; burners, turbines, regenerators. Matching of components. Plant performance; off-design performance of various configurations for power and propulsion. Control of gas turbine plants. Digital and analog computers for simulation and performance evaluation. (Half Course).

Lectures 3 hours a week, first term.

References: Hodge, Gas Turbines, Cycles and Performance Estimation.

Shepherd, Principles of Turbomachinery.

Lewis, Gas Power Dynamics.

E. P. Cockshutt

Engineering 545, Advanced Vibration Analysis

Non-linear vibrations: energy curves, phase trajectories, phase plane topology, singularities, the Poincaré criterion, Duffing and Van der Pol's equations, jump phenomena, limit cycles; method of Krylov and Bogoliubov, Liapunov's theorem of stability, harmonic and subharmonic oscillations, relaxation oscillations. Vibrations of elastic bodies: the use of normal coordinates, matric notation and energy methods. An introduction to random vibrations. (Half course).
Lectures 3 hours a week, second term.
References: Ku, Analysis and Control of Non-linear Systems.
Hurty and Rubenstein, Dynamics of Structures.
Crandell, Random Vibrations.
W. M. Mansour

Engineering 546, Heat Transfer

Steady and unsteady heat conduction equations in two and three dimensions; boundary conditions; methods of solution using analytical, analog and numerical techniques. Equations of thermal radiation; spectral distribution of radiant energy; radiant energy transfer by ideal and real surfaces; network analogs, numerical methods.
Fluid flow, boundary layers and convection. Free and forced convection; high speed flow and aerodynamic heating. Heat transfer with phase change. Combined modes of heat transfer; design of heat transfer systems.
Lectures 3 hours a week, both terms.
References: Kreith, Principles of Heat Transfer.
Kreith, Radiation Heat Transfer.
Carslaw and Jaeger, Conduction of Heat in Solids.
Schlichting, Boundary Layer Theory.

Engineering 547, Environmental Engineering

Thermal and humidity load analysis. Human comfort and tolerances. Environmental control methods: heating, refrigeration, humidification and drying; atmosphere and pollution control. System component characteristics; system analysis and design. Automatic controls. (Half Course).
Prerequisite: Engineering 546, or concurrent enrolment.
Lectures 3 hours a week, first term.
Text: Threlkeld, Thermal Environmental Engineering.
Not offered, 1965-66.

Engineering 550a, Electrical Materials

Structure and symmetry of solids. Types of crystal binding—ionic covalent, molecular. Defects in solids. Energy band theory of solids—metals, insulators and semiconductors. Thermoelectricity and thermoelectric refrigerators. Purification of solids—zone refining. Electric polarization—piezoelectric and ferroelectric materials, and their uses. Magnetic polarization—ferromagnetic materials and ferrites, and their uses. Luminescence in solids. Masers and lasers. (Half Course).
Lectures 3 hours a week, first term.
Text: Kittel, Elementary Solid State Physics.
Reference: Van der Ziel, Solid State Physical Electronics.
J. A. Goldak

Engineering 550b, Theory of Semiconductor Devices

The lectures are directed to the establishment of a sound understanding of the physical operation of semiconductor devices, as a basis for predicting and interpreting terminal electrical behaviour and the development of circuit models to represent small-signal and switching performance. The junction diode, transistor, FET, SCR, tunnel diode, and integrated circuits are discussed. (Half course).
Lectures 3 hours a week, second term.
Text: Gray, DeWitt, Boothroyd & Gibbons, Physical Electronics and Circuit Models of Transistors.
Reference: Nanavati, An Introduction to Semiconductor Electronics.
M. A. Copeland

Engineering 551a, Applied Electromagnetic Theory

Electromagnetic wave phenomena in isotropic, homogeneous media: vector and scalar potential, Hertz vector, electromagnetic energy, wave criteria, wave impedance in waveguides and across interfaces, fields in waveguides and cavities, network analysis of waveguides, fields produced by antenna arrays and aperture antennas, Fourier transform relationships between the radiation pattern and the aperture distribution, polarization of waves, laser beam fields. Introduction to effects due to anisotropic media and complex constitutive parameters. (Half course).
Lectures 3 hours a week, first term.
References: Atwater, Introduction to Microwave Theory.
Jones, The Theory of Electromagnetism.
G. D. Cormack

Engineering 551b, Topics in Electromagnetic Theory

Perturbational and variational techniques applied to waveguides and cavities. Waveguide network analysis, equivalent circuits of obstacles and irises in waveguides, propagation characteristics of ferrites and of waveguides containing inhomogeneous dielectrics. Electromagnetic wave interactions with inhomogeneous, anisotropic media. Sommerfield's solution to propagation over a flat earth using the plane-wave spectrum concept. (Half course).
Lectures 3 hours a week, second term.
References: Collins, Field Theory of Guided Waves.
Budden, Introduction to Wave-Guide Mode Theory of Wave Propagation.
Jones, The Theory of Electromagnetism.

Engineering 552a, Advanced Linear Systems

Mathematical techniques used in analysis of linear systems. Properties of finite, linear, lumped and bilateral parameter systems. Topics include: Fourier and Laplace transforms, inversion integrals, convolution integral, stochastic signals in linear systems, spectral concept, time-varying linear systems, signal flow graphs and stability. (Half Course).
Lectures 3 hours a week, first term.
Text: Brown, The Mathematical Theory of Linear Systems.
References: Kaplan, Operational Methods in Linear Systems.
Seshu and Balabanian, Linear Network Analysis.
D. A. George

Engineering 552b, Network Synthesis

Analytic properties of passive linear, lumped and bilateral parameter network functions. Driving point and transfer functions. Synthesis of one-port with two kinds of elements, general passive one-ports, lossless two-ports, insertion-loss synthesis realization of RC two-ports and general passive two-ports. Approximation problem. (Half Course).
Prerequisite: Engineering 552a.
Lectures 3 hours a week, second term.
Text: Balabanian, Network Synthesis.
Not offered, 1965-66.

Engineering 553, Random Processes

An introduction to the description of random signals. Time averages; time-auto-correlation functions, spectral functions and their properties; introduction to system optimisation. Sampling and recovery of signals. Probability theory; probability functions, joint and conditional probabilities, random variables, statistical averages, characteristic functions, sampling, law of large numbers, central limit theorem. Statistical description of time series. (Half course).
Lectures 3 hours a week, first term.
References: Lee, Statistical Theory of Communication.
Parzen, Modern Probability Theory and Its Applications.
D. A. George

Engineering 554a, Statistical Communication Theory and Information Theory

Description of random processes. Spectral calculations. Optimum linear systems: realizable and unrealizable Wiener filters, the matched filter. Noise sources; circuit noise calculations; noise figure. Statistical decision theory: hypothesis testing, parameter estimation. Information theory: basic concepts, the discrete channel, the continuous channel. Introduction to coding. Modulation systems. System comparisons. (Half course).
Lectures 3 hours a week, second term.
Prerequisite: Engineering 553.
Text: Harman, Principles of the Statistical Theory of Communication.
References: Davenport and Root, An Introduction to Random Signals and Noise.
Fano, Transmission of Information.
D. A. George

Engineering 554b, Advanced Topics in Communication Systems

A course dealing with recent and advanced topics in the field of communication systems and related areas. Primary references are recent publications in the field. Students registered in the course are expected to present one or more lectures or seminars on assigned topics. (Half course).
Prerequisite: Engineering 565.
Lectures and seminars 3 hours a week, one term.
Not offered, 1965-66.

Engineering 555a, Advanced Linear Control Theory

Review of the basic theory and methods of linear feedback control. Flow graphs. The root-locus method and application to compensation design. Linear control systems with random inputs and optimization. Linear sampled data systems. (Half Course). *Prerequisites*: Engineering 552a and 553, or concurrent enrolment.
Lectures 3 hours a week, first term.
Text: Truxal, Control System Synthesis.
H. W. Smith

Engineering 555b, Nonlinear, Time-Varying and Adaptive Control Systems

Analysis of nonlinear control systems: Phase Plane analysis and application to design; Describing Function analysis and applications. On-off systems. Liapunov method of stability analysis. Time-varying systems. Introduction to optimal and adaptive control systems. (Half course).
Prerequisite: Engineering 555a.
Lectures 3 hours a week, second term.
Texts: Graham and McRuer, Analysis of Nonlinear Control Systems.
Mishkin and Braun, Adaptive Control Systems.
H. W. Smith

Engineering 556a, Active Network Theory

Properties of the linear active quadripole; Happ's Tables, deviations; driving point immittances; transfer properties, voltage, current and power gain, stability factors. Mason's U function, network invariants. Power gain as a function of stability factor and reverse transfer admittance, Linvill charts. Active element pairs. Oscillator configurations. (Half course).
Lectures 3 hours a week, first term.
Text: Cote and Oakes, Linear Vacuum-Tube and Transistor Circuits.
Reference: de Pian, Linear Active Network Theory.
N. M. Brice

Engineering 556b, Active Network Design

Narrow-band selective amplifiers, single and multiple stages, stability, mismatch and neutralization, sensitivity to parameter variation. Feedback configurations. Wide-band amplifiers. Contaminating signals and noise, minimal noise circuits. Non-linearity, distortion and intermodulation, piecewise linear approximations. Instability and oscillators, comparison of basic oscillator configurations, frequency stability. In these applications, linear active network theory will be related to physical circuit mechanisms, and design emphasis will be on reliability. (Half course).
Prerequisite: Engineering 556a.
Lectures 3 hours a week, second term.
Reference: Cote and Oakes, Linear Vacuum-Tube and Transistor Circuits.
D. F. Page

Engineering 557, Topics in Computer Logic

The characteristics of diode and transistor gates; turn-on, turn-off times, delays. Logic design: systematic minimisation techniques; multiple outputs; NAND, NOR logic; implementation. Characteristics of bi-stable devices and circuits: Magnetic cores, solid state binaries. Pulse and pulse sequence generators, pulse amplification and reshaping. Sequential transducers. Arithmetic operations: algorithms, serial and parallel transfers, registers. Analogue to digital conversion techniques. (Half course).
Prerequisite: Engineering 466 or the equivalent.
Lectures 3 hours a week, second term.
References: Maley and Earle, Logic Design of Transistor Digital Computers.
Bartee, Lebow and Reed, Theory and Design of Digital Machines.
Ledley, Digital Computer and Control Engineering.
M. A. Gullen

Engineering 559, High Voltage Technology

Topics of discussion will include the problems associated with lightning and lightning protection with related impulse testing techniques; dielectric breakdown resulting from the application of both power frequency and transient voltages; corona and radio interference related to high voltage transmission lines. Secondary topics will include switching surges and high voltage DC for both particle accelerators and power transmission. Visits will be made to witness high voltage experiments and tests. (Half course).
Lectures 3 hours a week, second term.
Not offered, 1965-66.

Engineering 560, Digital Computer Applications in Engineering

The course is intended to familiarize the student with the digital computer as a standard tool in engineering analysis. The first part of the course deals with numerical methods for interpolation, integration, solution of algebraic equations, solution of ordinary and partial differential equations, matrix inversion and curve fitting. The properties of compilers and assemblers and the techniques of digital simulation will be presented. About a third of course time will be devoted to laboratory work using the IBM 1620 computer. The student will be required to select and solve a problem of considerable complexity in his own area of specialization. (Half course).
Prerequisite: The ability to program in 1620 SPS or FORTRAN.
Lectures and laboratory 3 hours a week, second term.
Text: Scarborough, Numerical Mathematical Analysis.
References: Ralston and Wilf, Mathematical Methods for Digital Computers.
C. D. Hall

Engineering 562, Electric Power System Engineering

Electrical characteristics of transmission lines, transformers and machines, circuit representation for analysis of power frequency behaviour, power flow and voltage analysis, unbalanced system analysis, symmetrical components. Steady state and transient stability. The use of analogue and digital computer techniques in stability analysis. Power system stability, means of improving stability, surge phenomena, insulation design of power systems, and discussion of problems in circuit breakers, relaying series capacitors, extra high voltage transmission, d.c. transmission. Application of probability methods to power system design and economic power system operation.
Lectures 3 hours a week, both terms.
Not offered, 1965-66.

Engineering 565, Digital Communication Systems

Description of digital signals and codes; correlation functions of digital signals; properties of codes. Applications to ranging, data transmission, and synchronization systems. Error correcting codes; mathematics of coding theory; certain particular codes. Implementation of digital systems. (Half course).
Prerequisite: Engineering 554a.
Lectures 3 hours a week, first term.
Texts: Golomb, et al., Digital Communications.
Peterson, Error Correcting Codes.
D. C. Coll

Engineering 566, Advanced Topics in Control Systems

A course dealing with recent and advanced topics in the field of control systems and related areas. Primary references are recent publications in the field. Students registered in the course are expected to present one or more lectures or seminars on assigned topics. (Half course).
Prerequisite: Engineering 555b.
Lectures and seminars 3 hours a week, one term.
Not offered, 1965-66.

Engineering 599, M.Eng. Thesis

Members of the Faculty

Engineering 699, Ph.D. Thesis

Members of the Faculty

English Language and Literature

Professor, Chairman of the Department	Munro Beattie
Professors	G. B. Johnston, R. L. McDougall (on leave of absence, 1965-66)
Associate Professors	Benjamin Jones, Marston LaFrance, G. J. Wood (on leave of absence, 1965-66)
Visiting Associate Professor	T. H. Coulson
Assistant Professors	Charles Haines, Maureen Hanna, Alan D. McLay, Thomas J. Middlebro', James Steele, Trevor Tolley, Lorna D. Young
Lecturers	Dolores Bedingfield, W. T. Bedwell, J. C. Cederstrom, T. J. Henighan, Michael Tait, Alistair Tilson, Douglas Wurtele
Sessional Lecturers	Thomas Farley, Nathan Moore Perry Nodelman, Sonia Tilson, Ruth M. Underhill, Linda Wright
Instructors	Jean Collins, Dorothy Judge, Isobel McKenna, Audrey Strutt
Teaching Fellows	Clive Saville, Jennifer Waterman

The objectives for students who elect English as their major or honours subject are as follows:
1. to become acquainted with the chief works of the principal authors;
2. to understand the main developments in language, ideas, and genre;
3. to acquire standards of literary judgement, appreciation, and expression.

N.B. Prospective students should obtain from the departmental office summer reading lists of the texts prescribed in all courses.

Major in English
Every student who elects English as his major subject will plan his program in conference with a representative of the department. The required courses in English are as follows:
—in the First year, English 165;
—in the Second year, English 200 and English 265;
—in the Third year, English 365;
—two or three additional courses in English, to be taken in the Second and Third years.

English 165 with a grade of C or better is prerequisite to English 200 and English 265.

Honours in English
An honours student will plan his program in conference with the Chairman of the department. The curriculum for honours in English comprises a number of courses which are restricted to honours students, besides those which are taken with major students. The following courses will be obligatory: English 165, 200, 265, 365 and 375 with the major students, English 270, 290 and 495 as courses restricted to honours students. Four additional courses in English will be required, three of which must be honours courses. At least six courses in other subjects should be taken, which should include history, philosophy, and a language other than English; in any subject selected, more than one course should be taken. History 353 is especially recommended.

During his final year every honours student will write four essays on topics related to four periods of English or American literature (English 495). He must also write

a comprehensive examination. The final-year essays and the comprehensive examination will have a considerable effect on the class of the degree recommended by the department.

Combined honours courses may be taken in English and German, English and French, English and History, English and Philosophy.

(For information regarding preparation for admission to the Ontario College of Education for the Interim High School Assistant's Certificate, Type A, students are invited to consult the Registrar. Students who look forward to high-school teaching as a career are urged to consider the advisability of taking an honours degree).

Graduate Studies

The Department of English will, where it is possible, provide programs of studies leading to the degree of Master of Arts in English Language and Literature. Such programs will be planned with regard both to each candidate's special requirements and to the library facilities available. (See also p. 66).

A candidate for the M.A. degree must have completed the requirements of an Honours B.A. degree in English Language and Literature or have similar qualifications. By departmental permission, certain of these requirements may be completed after the candidate has been admitted as a graduate student.

The student must obtain at least B standing in each of three graduate courses and must pass an oral examination on his thesis.

For details, consult the chairman of the English Department.

English 10, Literature and Composition

The course combines (a) the study of selected plays, poems, short stories, essays, and novels; (b) a systematic study of the art of writing English prose.
Day Division: Annually (classes three hours a week).
J. C. Cederstrom, Clive Saville, Ruth Underhill, and Jennifer Waterman
Evening Division: 1965-66 (classes four hours a week).
Lorna Young, Maureen Hanna
Summer, 1965: (lectures five hours a week).
Nathan Moore

English 100, English Authors from Chaucer to T. S. Eliot

A study of selected masterpieces in English literature from the fourteenth to the twentieth century—a course for students who do not elect English as a major subject. Essay-writing and regular participation in discussion groups are required. The course will comprise works by Chaucer, Shakespeare, Milton, Swift, Pope, Austen, Wordsworth, Dickens, Twain, Shaw, Leacock, Pratt, Eliot.
Prerequisite: English 10 or equivalent.
Day Division: Annually (lectures three hours a week, group discussion one hour a week).
T. Middlebro' (co-ordinator) and members of the department
Evening Division: 1965-66 (lectures three hours a week, discussion group one hour a week).
T. J. Henighan and T. Farley
Summer, 1965: (lectures five hours a week).
Linda Wright

English 101, English and Continental Texts: Dante to T. S. Eliot

A study of selected texts of English and Continental literature, including Chaucer, Dante, Shakespeare, Cervantes, Goethe, Blake, Dostoevsky, Lawrence, Baudelaire, T. S. Eliot. Continental texts will be read in translation. This is a course for students who do not, in the first year, elect English as a major. Essay-writing and regular participation in discussion groups are required.
Prerequisite: English 10 or equivalent.
Day Division: 1965-66 (lectures three hours a week, group discussion one hour a week).
B. W. Jones

English 115

A study of selected examples of literary genres from classical antiquity to the twentieth century. Open to students reading for an Engineering degree. This course may serve, at the discretion of the English Department, as a prerequisite to advanced courses in English.
Day Division: Annually (lectures two hours a week, discussion group one hour a week).
M. LaFrance, T. J. Middlebro', and M. Tait

English 165, Mediaeval and Renaissance English Literature

Authors studied will include Chaucer, Malory, More, Spenser, Marlowe, Shakespeare, Bacon, Jonson, Webster, Donne, minor poets, Milton and Bunyan.
For English Honours and Major students.
Day Division: Annually (lectures three hours a week, group discussion one hour a week).
T. Coulson, A. McLay, and D. Wurtele
Evening Division: 1965-66 (lectures three hours a week; discussion group one hour a week).
A. Tilson

English 200, Studies in Language and Literary Forms

A variety of texts will be read, with a view to an understanding of critical procedures and principles. Considerable attention will be given to language, prosody, bibliography, genres, and methods of analysis.
Prerequisite: English 165.
Day Division: Annually (lectures three hours a week).
A. M. Beattie, G. B. Johnston, A. Tilson

English 205, Writing Seminar

Not offered, 1965-66.

English 265, Restoration, Eighteenth Century, and Romantic Literature

Survey, for major and honour students, of the period from Dryden to Keats.
Prerequisite: English 165 or permission of the department.
Day Division: Annually (lectures three hours a week).
C. Haines, B. W. Jones
Evening Division: 1965-66 (lectures three hours a week).
J. C. Cederstrom

English 270, Old English

A study of Old English language and literature, including grammar and phonology, and translation of selections of Old English prose and poetry.
Texts: Sweet's Anglo-Saxon Primer, Ninth Edition, rev. Davis; and selected texts.
Day Division: Annually (lectures three hours a week).
G. B. Johnston

English 277, Renaissance Prose and Poetry

An intensive examination of the origins and development of the English Renaissance. (1500-1660).
Prerequisite: English 165 or permission.
Day and Evening Divisions: 1965-66 (seminars two hours a week).
A. McLay

English 278, Drama in England until 1642

Study of the development of dramatic production and literature from the middle ages to the closing of the theatres in 1642. Reading of representative plays, excluding Shakespeare.
Not offered, 1965-66.

English 285, Restoration and Eighteenth Century Literature

An intensive study of the origins and the thematic and rhetorical development of neo-classicism from Ben Jonson to Samuel Johnson.
Prerequisite: English 165 or permission of the instructor.
Day and Evening Divisions: 1965-66 (seminars two hours a week).
J. Steele
Summer, 1965: Day Division.
P. Nodelman

English 290, Literary Criticism from Aristotle to the Present

Text: W. J. Bate, Criticism: The Major Texts.
Prerequisite: Honours students; others by permission of the Department.
Day Division: Annually (lectures three hours a week).
T. Coulson, A. Tilson

English 320 [220], Chaucer, Spenser and Milton

Texts: F. N. Robinson (ed.), Chaucer's Complete Works.
Smith and De Selincourt (ed.), The Poetical Works of Edmund Spenser.
Hughes (ed.), John Milton, Complete Poems and Major Prose.
Day Division: 1965-66 (lectures three hours a week).
D. Wurtele

English 325, English Drama

The development of the drama in England from its mediaeval beginnings to the present day. Extensive study of relevant classical and continental theatre will be included.
Prerequisite: English 100 or 101 or 165 or permission of the instructor.
Not offered, 1965-66.

English 340, Nineteenth Century Literature

The major Romantic and Victorian poets from Wordsworth to Swinburne. Contemporary prose by Wordsworth, Coleridge, Carlyle, Newman, Mill, Arnold, Butler.
Prerequisite: English 165 or 100 or 101.
Not offered, 1965-66.

English 345, Major Twentieth-Century Authors—Anglo-Irish Literature

The poetry, drama, and fiction of the Anglo-Irish Literary Resurgence (1880-1940), with special consideration of works by W. B. Yeats, Lady Gregory, Oscar Wilde, Bernard Shaw, George Moore, J. M. Synge, AE (George Russell), Sean O'Casey, and James Joyce.
Prerequisite: English 100 or 101 or 165, or permission.
Day Division: 1965-66 (lectures three hours a week).
Lorna Young

English 346 (446), American Literature

A survey of American literature from colonial times to the present, concentrating on poetry and the novel.
Prerequisite: English 100 or 101 or 165 or permission.
Day Division: 1965-66 (lectures three hours a week).
T. Tolley
Summer: 1965: Day Division.
M. LaFrance

English 347, Writing in Canada since 1920

A study of selected works of contemporary Canadian authors: MacLennan, Callaghan, Raddall, Davies, Pratt, Klein, and others.
Prerequisite: English 100 or 165 or permission.
Not offered, 1965-66.

English 352, Contemporary Texts—Twentieth-Century Novels

Detailed analytic study of twentieth-century works of literature. In 1965-66 the emphasis will be on the modern novel.
Prerequisite: English 100 or 101 or 165 or permission.
Day and Evening Divisions: 1965-66 (lectures two hours a week).
T. Coulson, T. Henighan

English 365, Victorian and Twentieth-Century Literature

Survey for major and honours students of the period from 1850 to the present.
Prerequisites: English 165 and 265, or permission.
Day Division: Annually (lectures three hours a week).
C. Haines, T. Tolley

English 370, Middle English

A study of the English language and literature between the Norman Conquest and the fifteenth century. Special attention is given to fourteenth-century literature.
Prerequisite: For honours students, others by permission.
Day Division: (lectures three hours a week).
Maureen Hanna

English 375, Life and Works of Shakespeare

Intensive study of Shakespeare's environment and development as a dramatist, with careful reading of certain plays.
Prerequisite: English 100 or 101 or 165 or permission.
Evening Division: 1965-66 (lectures two hours a week).
A. M. Beattie, C. Haines
Summer, 1965: Day Division.
A. M. Beattie, C. Haines

English 380, Nineteenth-Century Thought

Readings in the Romantic and Victorian periods, emphasizing ideas on culture, society, and the uses of literature; Burke, Coleridge, Carlyle, Newman, Mill, Bagehot, Ruskin, Arnold, Huxley, Butler, Morris, and Shaw receive special attention.
Prerequisite: For honours students; others by permission.
Day and Evening Divisions: 1965-66 (seminar two hours a week).
T. G. Middlebro'

English 385, Restoration and Eighteenth-Century Drama

Not offered, 1965-66.

English 392, Canadian Literature

A study of the origins and development of a national literature in Canada, and, specifically, of selected works of the following authors: Haliburton, Moodie, Sangster, Mair, Crawford, Lampman, Scott, Carman, Roberts, Duncan, Leacock, Grove, Callaghan, MacLennan, Pratt, Klein, Davies, Raddall, Wilson, Ross, Macpherson, Reaney, Birney, Layton. The course will include also studies in the periodical literature of Canada.
Prerequisite: English 100 or 101 or 165 or permission.
Day Division: 1965-66 (lectures three hours a week).
T. Bedwell

English 410, Old English Poetry

Translation and study of the text of Beowulf and the Finnsburg Fragment.
Prerequisite: Permission of the instructor.
Not offered, 1965-66.

English 412, Old Norse

An introductory study of the Old Norse language and literature.
Text: An Introduction to Old Norse, Gordon, rev. Taylor.
Prerequisite: English 270 or an equivalent course in Old English, or permission of the instructor.
Day and Evening Divisions: 1965-66 (seminars three hours a week).
G. B. Johnston

English 445, Major American Authors

A detailed examination of the thought and work of five, six, or seven important American writers: for 1965-66, Poe, Thoreau, Melville, Crane, Stevens, Faulkner. *Prerequisite*: English 346 (446) or permission.
Day and Evening Divisions: 1965-66 (seminars two hours a week).
M. LaFrance

English 480, The English Novel

The development of the art of fiction in English literature, from its beginning in the eighteenth century, through the major Victorian novelists, to the chief authors of the twentieth century.
Not offered, 1965-66.

English 490, Directed Tutorial

Occasionally a student may undertake a piece of individual research under the supervision of a member of the Department.
Day or Evening Division:

English 495

Essay-writing and tutorials, required of all honours students in their final year.
Maureen Hanna, J. Steele, T. Tolley, Lorna Young

Graduate Courses Available 1965-66

English 516, Fourteenth-Century Poetry
Maureen Hanna

English 521, Seventeenth-century Studies
J. Steele

English 530, Eighteenth-century Studies
B. W. Jones

English 545, Nineteenth-century Studies
Not offered, 1965-66.

English 550, American Literature
M. LaFrance

English 555, Canadian Poetry
T. Bedwell

English 556, The Canadian Novel
Not offered, 1965-66.

English 560, Henry James and the Modern Novel
A. M. Beattie

English 599, M.A. Thesis
Members of the Department

In special circumstances, arrangements may be made for work in other fields. (See also the announcement of the Institute of Canadian Studies, p. 40).

French

Professor: Chairman
of the Department   J. S. Tassie
Associate Professors   C. P. Fleischauer, E. F. Kaye, Eva Kushner
Assistant Professors   J.-P. Baril, W. B. Kay, P. Laurette
Lecturers   A. Elbaz, Madeleine Gobeil, J. Miquet
Sessional Lecturers   B. Benkis, G. S. DuVernet, W. Fraser

As Carleton University is situated in a bilingual community, students are encouraged to take advantage of the multiple opportunities for practical appreciation of the language. Radio, television, cinema, stage, the press, and everyday conversation are at hand to supplement academic course work. Class lectures are generally conducted in French. The Department also has at its disposal a fully equipped language laboratory.

Major in French

A student wishing to major in French must have 'C' standing or better in French 100. The major in French will consist of a minimum of four courses beyond French 100, one of which must be a 300 course. The student should consult the department *at the end of the first year* to plan his program with care for the comprehensive examination which he must pass at the end of his final year. The comprehensive will be given once a year prior to the spring examination period.

Honours Course

Several honours programs are available. Course patterns are designed to assure a balanced appreciation of all periods of French literature, with competence in oral and written expression in the French language. Interested candidates will note the general regulations governing honours on p. 30. The Department requires in addition that candidates do summer reading, include practical work in the laboratory in *each* year of the program, and sit for a comprehensive examination at the end of the final year.

Combined honours programs are available in *French and German* (see also p. 156), *French and Russian* (see also p. 219), *French and English* (see also p. 129), and *French and Spanish* (see also p. 227). They are intended to prepare the student for the Ontario College of Education courses leading to the Interim High School Assistant's Certificate, Type A, and must be planned in close consultation with the departments concerned. General information on Ontario College of Education requirements may be obtained from the Registrar.

Honours in French
This program is designed for students intending to pursue graduate studies in the field of Romance languages. It normally consists of twenty courses after Grade 13, and will include the study of a second language other than English each year.

In the First Year the following courses will be chosen:
English 100 or 101;
Philosophy 100 or Humanities 100;
History 100 or 115;
French 100;
a course in German (or Spanish or Russian or Latin[1]);
a First year course in science or mathematics[2].

[1]Students must have standing in Latin 10 or equivalent before graduation.
[2]Students are expected to take a science course before graduation. This requirement of the First year may be fulfilled in the Second year.

Senior courses will include:

> 9 additional course credits in French, of which two must be at the 300 and two at the 400 level;
> 3 additional course credits in German (or Spanish or Russian or Latin);
> a further course in: English, History, Philosophy, Classics, or Psychology.

Graduate Studies

The department offers studies leading to the M.A. degree in fields for which facilities are at hand. The courses listed in the 500 series are currently available; the student may be directed, however, to select certain of these in combination with others, e.g., French 470 or French 490. Attention is also drawn to the general regulations found on pp. 66-68.

Courses Offered: 1965-66
Day only: 201*, 202*, 215, 220, 225, 301*, 302*, 315, 330, 430.
Day or Evening· 521, 530, 535, 540, 545.
Evening: 1, 210.
Day and Evening: 10, 100.

French 1, Elementary French

A non-credit introductory course preparing students for French 10. Grammar, reading, language laboratory. Designed for students who have had no French.
Texts: Lenard, *Parole et pensée;* and graded readers.
Evening Division: Annually (two lectures a week).
Summer 1965 (two lectures a week).
J. Miquet

French 10, Readings in Modern French

Selections by modern French authors. Exercises in vocabulary and style, with emphasis on conversation and composition.
Texts: Politzer, *Active review of French.*
Ginestier et Maillet, *Culture et civilisation françaises.*
Gougenheim, *Dictionnaire fondamental.*
Day Division: Annually (three lectures a week).
Evening Division: Annually (two lectures a week).
Summer 1965 (two lectures a week).
M. Gobeil and Members of the Department

French 100, French Literature

Brief but inclusive review of the development of French literature, with emphasis on reading and study of representative literary works of all types. Composition and oral practice for students intending to major in French.
Texts: Membres du département, *Anthologie de la littérature française.*
Corneille, *Horace*; Racine, *Andromaque;* Molière, *Tartuffe.*
Reference Texts: Brereton, *A short history of French Literature;* Plinval, *Histoire de la littérature française.*
Prerequisite: French 10 or equivalent.
Day Division: Annually (lectures three hours a week; practice sessions to be arranged).
Evening Division: Annually (two lectures a week).
Summer 1965 (five lectures a week).
E. F. Kaye and Members of the Department

French 201*, Le français oral

Phonétique et conversation; travaux de laboratoire.
Texts: *Petit Larousse illustré;* Léon, *Introduction à la phonétique corrective;* Léon, *Exercices systématiques de prononciation française,* Vols. I & II; Courtney, *Les meilleures pages du Figaro.*
Prerequisite: French 100 grammar and language laboratory.
Day Division: Annually (two hours a week throughout the year).
Summer 1965: (five lectures a week).
W. Fraser and J.-P. Baril

French 202*, Explication de texte

Examen détaillé d'un petit nombre de chefs-d'oeuvre littéraires pour développer l'art de l'explication de texte.
Texts: Dhénin, *De l'Explication de texte au sujet général; Poètes du XVIe siècle* (Classiques Vaubourdolle); Saint-Simon, *Mémoires* (Classiques Larousse); J.-J. Rousseau, *Pages choisies* (Classiques Vaubourdolle); *Verlaine et les poètes symbolistes* (Classiques Larousse).
Prerequisite: French 100 grammar.
Day Division: Annually (two hours a week throughout the year).
Summer 1965: (five lectures a week).
E. F. Kaye and J. Miquet

French 210, La littérature et la pensée françaises du 17e siècle

La littérature de l'âge baroque et de l'âge classique.
Texts: Rousset, *Anthologie de la poésie baroque;* Mme de La Fayette, *La Princesse de Clèves* (Droz); choix de Classiques Larousse et de Classiques Bordas.
Prerequisite: French 100.
Evening Division: 1965-66 (two lectures a week).
W. B. Kay

French 215, La littérature et la pensée françaises du 18e siècle

Prolongement du classicisme. Les nouvelles idées politiques, sociales, religieuses, philosophiques.
Texts: Fellows and Torrey, *The age of Enlightenment.*
Prerequisite: French 100.
Day Division: Annually (three lectures a week).
C. P. Fleischauer

French 220, La littérature et la pensée françaises du 19e siècle

Du romantisme au naturalisme et au symbolisme.
Texts: Lagarde et Michard, *XIXe Siècle;* Chateaubriand, *Atala, René* (Garnier); Balzac, *Eugénie Grandet* (Garnier); Flaubert, *Madame Bovary* (Garnier); Zola, L'Assommoir (Livre de Poche).
Prerequisite: French 100.
Day Division: Annually (three lectures a week).
E. F. Kaye

Du symbolisme et du naturalisme à nos jours. Etude détaillé d'un choix d'oeuvres parmi les grands écrivains représentatifs d'aujourd'hui.
Textes: Lagarde et Michard, *XXe Siècle;* Apollinaire, *Poèmes choisis* (Livre de Poche); Proust, *Morceaux choisis* (NRF); Camus, *La peste;* Sartre, *Théâtre I* (NRF).
Prerequisite: French 100.
Day Division: Annually (three lectures a week).
Eva Kushner

French 301*, Conversation et traduction

Cours de conversation avancée; l'art de la traduction; travaux de laboratoire.
Texts: *Petit Larousse;* Mansion, *A Grammar of Present-day French;* Ireson, *A Manual of French Prose Composition.*
Prerequisite: French 201* or permission of the Department.
Day Division: Annually (two hours a week throughout the year).
W. Fraser and J. Miquet

French 302*, La dissertation française

Les méthodes de la préparation d'un exercice littéraire sur un sujet donné.
Text: Thoraval, *La Dissertation française.*
Prerequisite: French 202*.
Day Division: Annually (two hours a week throughout the year).
J.-P. Baril

French 305, L'ancien français

Les origines de la langue; étude de la littérature du Moyen Age.
Texts: Lagarde et Michard, *Moyen Age.*
Thrift Press Latin Grammar.
Prerequisite: French 210 and Latin 10.
Not offered, 1965-66.

French 310, La littérature et la pensée françaises du XVIe siècle

L'humanisme, la renaissance et l'âge de la réforme.
Texts: Lagarde et Michard, *XVIe Siècle.*
J. Plattard, *La Renaissance des lettres en France.*
Rabelais, *Tome I* (Budé).
Montaigne, *Le Troisième Livre* (Budé).
Choix de Classiques Larousse.
Prerequisite: French 210 or permission of the Department.
Summer 1965: (five lectures a week).
Not offered, 1965-66.

French 315, Histoire des idées en France

Le mouvement des concepts indispensables au développement de la littérature.
Texts: Daval, *Histoire des idées en France;* Cresson, *Les Courants de la pensée philosophique française;* et textes choisis.
Prerequisite: French 210 or 215 or 220 or 225.
Day Division: 1965-66.
C. P. Fleischauer

French 330, Littérature canadienne de langue française

Etude de la littérature canadienne faite à la lumière des mouvements tant français qu'américains.
Texts: G. Sylvestre, *Anthologie de la poésie canadienne française;* choix des romans importants depuis *Les Anciens Canadiens.*
Reference Text: Tougas, *Histoire de la littérature canadienne-française.*
Prerequisite: French 210 or 220 or permission of the Department.
Day Division: 1965-66 (three lectures a week).
J. S. Tassie

French 346, Histoire de la civilisation française

Texts: Seignobos, *Histoire sincère de la nation française;* Blancpain et Clarac, *La France d'aujourd'hui.*
Prerequisite: French 210 or 215 or permission of the Department.
Not offered, 1965-66.

French 401*, Stylistique

Principes de la stylistique; analyse de textes choisis.
Texts: *Petit Larousse;* Marouzeau, *Précis de stylistique française.*
Prerequisite: French 301* or permission of the Department.
Day Division: 1965-66 (two hours a week throughout the year).
P. Laurette

French 402*, La bibliographie

Les sources du travail bibliographique et les méthodes de recherche littéraire.
Texts: Maeclès, *La bibliographie;* Hervier, *Initiation aux études supérieures de français.*
Not offered, 1965-66.

French 430, La critique littéraire en France

Théorie et pratique du jugement littéraire.
Prerequisite: French 210, 215, 220 or 310.
Day Division: 1965-66: *Les manifestes littéraires du XVIe siècle.*
Eva Kushner

French 440, Le roman français

Les principaux courants du roman moderne.
Prerequisite: French 210 or 215 or 220 or 225, or permission of the Department.
1964-65: *L'entre-deux-guerres; le roman depuis 1945.*
Not offered, 1965-66.

French 450, La poésie française

Evolution des formes poétiques, des lois de la versification, des thèmes et des symboles.
Texts: Chiari, *The Harrap Anthology of French Poetry;* choix de recueils de poésies.
Prerequisite: French 210 or 220 or 310 or permission of the Department.
1964-65: *Etude d'œuvres représentatives, depuis le Moyen Age jusqu'au XIXe siècle.*
Not offered, 1965-66.

French 460, Le théâtre en France

Etude des genres dramatiques à travers leurs principaux représentants.
Texts: R. Pignarre, *Histoire du théâtre;* L. Chancerel, *Panorama du théâtre;* R. Lalou, *Le théâtre en France depuis 1900.*
Prerequisite: French 210 or 220 or 225 or permission of the Department.
1963-64: *L'évolution du théâtre français depuis les mystères jusqu'au théâtre contemporain.*
Not offered, 1965-66.

French 470, Seminar on a topic of French literature

Examination of a particular theme or area in French studies by directed readings and papers. Intended primarily for honours and graduate students.
Not offered, 1965-66.

French 490, Tutorial

Directed study, including essays, designed to fill special needs of individual students at the senior undergraduate or graduate level.

French 505, Introduction to Romance philology

The historical development of the French language and its relations with the other Romance languages.
Prerequisites: Latin 10 and French 305 or 310.
Not offered, 1965-66.

French 510, Dialectologie française

Introduction aux méthodes de l'analyse dialectologique. Exploitation de textes primitifs français et canadiens.
Not offered, 1965-66.

French 520, Le roman canadien de langue française

Etude d'un choix de romans canadiens-français. (See also p. 41).
Prerequisite: French 330.
Not offered, 1965-66.

French 521, La poésie canadienne de langue française

Etude approfondie de plusieurs des poètes marquants du Canada français. (See also p. 41).
Prerequisite: French 330.
Day Division: 1965-66 (three lectures a week).
J. S. Tassie

French 530, Problèmes de l'histoire littéraire au XVIe siècle

Prerequisite: French 310.
Day Division: 1965-66; *Ronsard théoricien de la littérature.*
Eva Kushner

French 535, Aspects du classicisme

Prerequisite: French 210.
Day Division: 1965-66.
W. B. Kay

French 540, Penseurs et réformateurs du 18e siècle français

Montesquieu et le relativisme, les idées de Voltaire sur la tolérance et la liberté, Diderot et le matérialisme, Rousseau théoricien de la politique et de la pédagogie.
Texts: Montesquieu, *Lettres persanes* (Droz); *De l'esprit des lois* (Garnier); Voltaire, *Lettres philosophiques* (Blackwell); *Dictionnaire philosophique* (Garnier); Diderot, *Oeuvres philosophiques* (Garnier); *Oeuvres esthétiques* (Garnier); Rousseau, *Lettre à d'Alembert sur les spectacles* (Droz); *Emile* (Garnier); *Du Contrat social* (Aubier).
Prerequisite: French 215 or 315.
Day Division: 1965-66 (three lectures a week).
C. P. Fleischauer

French 545, Le romantisme

Etude approfondie d'un aspect important du romantisme.
Prerequisite: French 220.
1964-65: *La poésie lyrique de la période romantique.*
Texts: Victor Hugo, *Œuvres choisies* (2 v. Hatier); Maurois, *Olympio ou la vie de Victor Hugo* (Hachette).
Day Division: 1965-66: (*Victor Hugo*).
E. F. Kaye

French 550, Aspects de la littérature du XXe siècle

Prerequisite: French 225.
Not offered, 1965-66.

French 570, Seminar on a particular author

Study of the work of one of the major authors of French literature. Papers and reports.

French 599, M.A. Thesis

Geography

Professor; Chairman
of the Department   G. C. Merrill
Associate Professors   J. Peter Johnson, Jr., Philip E. Uren
Assistant Professor   Duncan M. Anderson
Sessional Lecturers   J. Keith Fraser, Grace Powell

Pass Course

Students majoring in Geography in the Pass Course are required to complete six courses in Geography. The program is as follows:

Earth Science 100, taken in the First year, with a grade of 'C' or better, Geography 230, and four additional geography courses, at least one from each group.

Group I   Geography 210, 220, 325
Group II   Geography 250, 315, 320, 360, 430
Group III Geography 340, 420, 435, 440.

Honours Course

Honours programs may be entered from the Honours First Year in the Social Sciences (see p. 37) or by transfer from the Pass course if the appropriate standing has been attained. Students reading for an Honours degree in Geography must satisfy the general University regulations for Honours (see p. 30). In addition to following a program of courses selected in consultation with the Chairman of the Department, students are expected to attend a departmental field course at the beginning of their fourth year. The program of courses normally followed is outlined below.

Year I

1. English 100.
2. Philosophy 100 or Humanities 100.
3. One of: Economics 100, History 100 or 115, Political Science 100, Psychology 100, Sociology 100.
4. A language other than English (at the 100 level).
5. Earth Science 100.

Year II

1. Geography 210, 220, or 325.
2. One regional course selected from Geography 250, 315, 320, 360, 430.
3. Geography 230.
4. One additional year of a foreign language, OR, one of Mathematics 100, 101, 130, or 255*/256*.
5. One elective.

On completion of YEAR II, the student must choose between the Cultural Geography and the Physical Geography options.

Year III

1. Geography 210, 220, or 325.
2.
and } Two of Geography 340, 420, 435, 440.
3.

Cultural Geography Option:

4. One course in a Social Science (which becomes a minor subject).
5. One elective.

Physical Geography Option:
4. One additional year of a foreign language, OR, one of Mathematics 100, 101, 130, or 255*/256* (whichever not taken in Arts II).
5. One of Physics 100, Chemistry 105, or Biology 100.

Year IV
1. Geography 320, 430, or another regional course.
2. Geography 490.
3. Geography 498.

Cultural Geography Option:
4. An additional course in the minor subject.
5. An additional course in the minor subject, or if three courses in the minor subject already completed, a free elective.

Physical Geography Option:

4.
and } Two courses above the 100 level from geology or one of the natural sciences
5. } or allied subjects previously selected.

Students wishing to enter the Type A specialist certificate course at an Ontario College of Education are required to complete thirteen courses in geography for credit. They are advised to consult the Department as early as possible in order that an appropriate program can be arranged.

Earth Science 100

The evolution of the continents; rocks and minerals; mountain building and deformation; the cycle and agents of erosion; climatology; soils; oceanography; the genetic study of land forms.
Textbook: Arthur Strahler, The Earth Sciences.
F. K. Hare, The Restless Atmosphere (supplementary reading to be announced).
Day Division: 1965-66 (lectures two hours a week, laboratory two hours a week, one field excursion).
J. P. Johnson

Geography 112, Physical Geography

Climatology; soils; oceanography; the genetic study of land forms. (Half course).
Text: Arthur Strahler, The Earth Sciences.
F. K. Hare, The Restless Atmosphere.
Day Division: 1965-66 (lectures two hours a week, laboratory two hours a week, one field excursion. This course is the second term of Earth Science 100).
J. P. Johnson

Geography 210, Principles of Geomorphology

A systematic study of the origin and evolution of relief features of the earth. The application of existing concepts and methods of investigation to problems in interpretation will be emphasized, and geomorphic processes active in northern areas will be studied in detail.
Text: B. W. Sparks, Geomorphology.
Reference Text: Flint, Glacial and Pleistocene Geology.
Prerequisite: Earth Science 100 or Geology 100.
Day Division: 1965-66 (lectures two hours a week, laboratory two hours a week, two field excursions).
J. P. Johnson

Geography 220, Climatology

Physical, dynamic, and applied climatology; weather processes; microclimatology; climate classifications; climatic change; climate and biotic phenomena.
Text: Critchfield, General Climatology.
Prerequisite: Earth Science 100, Geography 112 or permission of instructor.
Not offered, 1965-66.

Geography 230, Cultural Geography

The development and distribution of human societies with particular reference to both culture and habitat.
Reference Texts: Philbrick, This Human World.
Wagner and Mikesell, Readings in Cultural Geography.
Day Division: 1965-66 (lectures and discussion three hours a week).
D. M. Anderson and G. C. Merrill

Geography 250 [450], Europe

The physical and cultural regions of Europe will be examined in detail. Emphasis will be placed upon the pattern of economic activity within the continent.
Texts: Gottman, A Geography of Europe, 3rd edition.
Dollfus, Atlas of Western Europe.
Prerequisites: Earth Science 100, Geography 112, or permission of the Department.
Day Division: 1965-66 (lectures and discussion three hours a week).
D. M. Anderson

Geography 315 (215), North America

This course outlines the physical, historical and economic geography of North America as a whole. Principal regions of the continent are dealt with in detail.
Text: Watson, North America.
Reference Text: Mead and Brown, The United States and Canada.
Prerequisite: Earth Science 100, or Geography 112.
Not offered, 1965-66.

Geography 320, Geography of the Humid Tropics

A comprehensive regional study of the humid tropical environment with special emphasis upon Latin America and the Caribbean. Indigenous economies; development of plantations; agricultural and industrial potentials.
Reference Text: Pierre Gourou, The Tropical World.
Prerequisite: Earth Science 100 or Geography 112.
Not offered, 1965-66.

Geography 325, Cartography

The study and construction of the major map projections; the fundamentals of lettering and map layout; the construction of special purpose maps, such as land use, population, production, etc.
Text: Robinson, Elements of Cartography, 2nd edition.
Prerequisite: Permission of the instructor.
Evening Division: 1965-66.
Grace Powell

144

Geography 340, Economic Geography

Study of the agricultural and industrial resources and regions; quantitative analysis of selected problems in economic geography.
Reference Texts: To be announced.
Prerequisite: Earth Science 100 or Geography 112.
Not offered, 1965-66.

Geography 360, Soviet Union

This course examines the geographic basis of Soviet society. Particular emphasis is placed on the role of physical factors, including location, size, climate, vegetation, and soils in the economic and political development of the Soviet Union.
Reference Texts: To be announced.
Prerequisite: Earth Science 100, or Geography 112, or permission of the Department.
Day Division: 1965-66 (lectures three hours a week).
P. E. Uren

Geography 410, Field Geography

The principles and techniques of analysis, mapping and recording data in the field. Honours students are expected to attend this course at the beginning of Year IV but for no course credit. Further information may be had on application to the Department.
Text: To be announced.
Members of the Department

Geography 420, Urban Geography

Analysis of internal structure of cities with emphasis on arrangement and characteristics of commercial, industrial and residential districts; the city and its hinterland, problems of land utilization associated with urban development.
Text: Mayer and Kohn, Reading in Urban Geography.
Not offered, 1965-66 (lectures three hours a week).

Geography 430, Geography of the Northern Lands

A study of arctic and sub-arctic regions. The physical geography, exploration and development of northern areas will be considered, and the resource potential and problems of settlement examined.
Reference Texts: To be announced.
Prerequisite: Earth Science 100, Geography 112, or permission of the Department
Evening Division: 1965-66 (lectures two hours a week).
J. Keith Fraser

Geography 435 (235), Historical Geography

A study is made of the relation of man, habitat, and economy of past eras. The role of man as an ecologic dominant is stressed. The geographic setting of the past is reconstructed for a number of societies.
Reference Texts: Ralph Brown, Historical Geography of the United States.
John Warkentin, The Western Interior of Canada.
Prerequisites: Earth Science 100, Geography 112, or permission of the instructor.
Evening Division: 1965-66 (lectures two hours a week).
G. C. Merrill

Geography 440, Political Geography

This course examines the geographic structure of the nation state, including capitals and "core areas", boundaries and frontiers, and global patterns of political activity.
Text: Norman J. G. Pounds, *Political Geography,* McGraw-Hill, 1963.
Day Division: 1965-66 (lectures and discussion, three hours per week).
P. E. Uren

Geography 490, Tutorial in Geography

The development of ideas and methods in Geography. Examination and discussion of original works.
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually (hours arranged).
Members of the Department

Geography 498, Honours Thesis

Candidates for Honours in Geography are required to write an Honours Thesis during their final year. The subject for research will be determined in consultation with the Department and a supervisor will be assigned. The candidate will be orally examined upon his dissertation after presentation.
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually (hours arranged).
Members of the Department

Geology

Professor; Chairman of
the Department   F. K. North
Associate Professors   P. A. Hill, W. M. Tupper
Assistant Professors   G. Y. Chao, K. Hooper, J. M. Moore, Jr., R. W. Yole
Chief Demonstrator   L. Kaye
Special Lecturers   Marjorie Allen, R. W. Boyle
Sessional Lecturers   R. L. Borden, P. J. Hood, E. R. Niblett, J. A. Soles
Demonstrator   Mary A. Wickens

The proximity of the University to libraries, research offices, and laboratories of the Geological Survey of Canada, the Dominion Observatory, the Mines Branch, and the National Research Council, enables undergraduate and graduate students in the Geological Sciences to make contact with leading workers in their fields. Lectures by visiting scientists and meetings of various technical groups are open to students of the University.

B.Sc. Program

The B.Sc. program in Geology is of four years duration and requires a total of twenty courses. Candidates must satisfy the requirements of the Qualifying University and First years of the general B.Sc. program. Geology 100 may be taken in either the Qualifying or First year. It must be followed by Geology 220, 230, and 272, by all the 300 series courses, and, in the final year, by at least three 400-series courses in Geology, chosen in consultation with the Department.

The minor subject, in which three courses are required, should be Biology, Chemistry, Mathematics or Physics. The following courses are mandatory: Biology 100, Chemistry 100, Mathematics 100, and Physics 100. Candidates must pass two of these four courses before they may register for the 200 series courses in Geology.

A three-year program, leading to a non-professional B.Sc. degree with major in Geology, is also available. All requirements are as for the B.Sc. degree in Geology except that no courses beyond the 300-series are required.

B.Sc. (Honours) Program

Honours requirements are:

a) At least ten courses in Geology, of which nine are mandatory and one may be selected with the approval of the Department. Mandatory courses are Geology 100, 220, 230, 272*, 310, 350, 360, 420, 480, 498.

b) Mathematics 100 and at least one advanced course in Mathematics.

c) A total of six or seven Science courses other than Geology, of which it is desirable to have four in one field. Minors in Physics should take three courses in Physics and two in Mathematics.

d) Three non-Science, non-Mathematics courses, including one language other than English.

e) A comprehensive oral examination at the end of the Fourth year.

f) University requirements concerning Honours standing must be maintained in a combination of the major and minor fields.

Graduate Studies

The Department offers instruction leading to the degrees of Master of Science and Doctor of Philosophy. Details may be obtained from the Chairman.

The candidate for the Master of Science degree will be required to:

a) comply with the general regulations of the Faculty of Graduate Studies,

b) if entering from another University, write a preliminary orientation examination in the Geological Sciences, covering those fields in which he claims competence at the undergraduate level,

c) take Geology 500,

d) take two additional 500 series courses, or, in special cases, two full courses in an ancillary science at the Honours level which may be substituted on recommendation of the Director of Research,

e) take such additional non-credit courses in ancillary sciences or Geology as may be required by the Director of Research,

f) prepare a thesis based on the candidate's own research, and defend it,

g) demonstrate a reading knowledge of geological subjects in a language other than English.

The candidate for the degree of Doctor of Philosophy will be required to:

a) comply with the general regulations of the Faculty of Graduate Studies,

b) prove his ability to do guided research either through satisfactory completion of a M.Sc. thesis, or by having reports or published papers to his credit which demonstrate his research ability,

c) take a preliminary orientation examination if entering from another university,

d) take at least one graduate course in Geology prescribed by the Department,

e) take such other formal or directed reading courses as may, in the opinion of his Director of Research, be desirable as preparation for the comprehensive examinations.

f) take comprehensive written and oral examinations in two fields of Geology,

g) prepare a thesis, on a problem formulated by the candidate, which should be a contribution to basic knowledge in the Geological Sciences or immediately related fields,

h) defend his thesis in public,

i) demonstrate a reading knowledge of geological subjects in one language which is not an official language of his country of origin, the language chosen to be acceptable to the Department.

Within each series the subjects are divided into fields of interest as follows:

0- 9—General courses or those covering several fields of geological study or research.

10-19—Structural geology, geomorphology.

20-29—Mineralogy, crystallography, ore deposits.

30-39—Palaeontology, micropalaeontology.

40-49—Oceanology and submarine geology.

50-59—Petrology.

60-69—Stratigraphy and sedimentation, fossil fuels.

70-79—Geological techniques.

80-89—Geochemistry and geophysics.

90-99—Directed studies, theses, and research projects.

In the following listing, full courses end in "0" or '5', half courses (first term) in '1', '3', or '7', and half courses (second term) in '2', '4', '6' or '8'. An asterisk follows all half-courses.

Geology 100, General Geology

The earth in space; evolution of the continents and oceans; rocks and minerals; mountain building and deformation; the cycle and agents of erosion; the history of life and the growth of geological ideas.
Texts: Spencer, Basic Concepts of Physical Geology.
Spencer, Basic Concepts of Historical Geology.
Hill, General Geology Laboratory Manual.
Day Division: Annually (lectures two hours a week, laboratory three hours a week, two half day field excursions first term, one full day field excursion after the final examinations).
Evening Division: 1965-66 (lectures two hours a week, laboratory two hours a week, two half-day field excursions first term, one full day excursion after the final examinations).
F. K. North, Marjorie Allen, L. Kaye

Geology 201,* Introductory Geology for Engineers

Fundamentals of geology with emphasis on the needs of engineers.
Texts: To be assigned.
Day Division: 1965-66 (lectures three hours a week, laboratory three hours a week, two field excursions; first term).
P. A. Hill, L. Kaye

Geology 220, Mineralogy

Morphological study and classification of crystals. Essentials of crystal chemistry. Chemical and physical properties of minerals, systematic mineralogy of common silicates, sulphides, etc. Principles of optical crystallography. Laboratory: study of crystal models, mineral identification and the use of the polarizing microscope.
Texts: Phillips, Introduction to Crystallography
Berry and Mason, Mineralogy
Bloss, Introduction to the methods of optical crystallography.
Reference Texts: Dennen, Principles of Mineralogy
Dana's Textbook of Mineralogy, 4th edition.
Prerequisites: Geology 100, Chemistry 100.
Day Division: 1965-66 (lectures three hours a week, laboratory three hours a week).
G. Y. Chao

Geology 230 (330), Palaeontology

The principles of palaeontology; the classification of fossil invertebrates, their morphology and evolutionary history. Reference to the broader phases of plant and vertebrate evolution. An introduction to the use of fossils in stratigraphic interpretation.
Text: To be announced.
Reference Texts: Moore, Lalicker and Fischer, Invertebrate Fossils.
Moore, et al., Treatise on Invertebrate Palaeontology.
Shimer & Shrock, Index Fossils of North America.
Prerequisites: Geology 100, and a first year Biology, or Zoology, or Botany course acceptable to the Department.
Day Division: 1965-66 (lectures and laboratory five hours a week).
K. Hooper

Geology 272*, Elements of Field and Structural Geology

Techniques of geological mapping; the observation and interpretation of field data; the use of topographic maps and aerial photographs. Writing the geological report.
Prerequisite: Geology 100.
Texts: Texts and supplementary reading to be announced.
Day Division: 1965-66 (combined seminars and laboratory two hours a week, second term; ten days field work in the spring of 1966, exact dates to be announced).
P. A. Hill

Geology 310 (210), Structural Geology

Secondary rock structures and their origins. Laboratory: the use of maps and air photographs; mathematical and graphical solution of depth, fold, and fault problems; structures as seen under the microscope; field problems.
Reference Texts: To be announced.
Prerequisite: Geology 100.
Day Division: 1965-66 (lectures two hours a week, laboratory three hours a week).
P. A. Hill

Geology 350, Petrology

Brief introduction to the elements of thermodynamics and phase chemistry applicable to petrology. The composition, classification, fabric, occurrence, association and origin of the igneous, sedimentary, and metamorphic rocks. Laboratory: The optical properties of rock forming minerals. Megascopic and microscopic examination of rocks.
Text: Moorhouse, The Study of Rocks in Thin Section.
Reference Texts: Turner and Verhoogen, Igneous and Metamorphic Petrology.
Krumbein and Sloss, Stratigraphy and Sedimentation.
Prerequisites: Geology 220, Chemistry 100.
Day Division: 1965-66 (combined lectures and laboratory six hours a week).
J. M. Moore

Geology 360, Historical Geology

Principles of sedimentation and stratigraphy. Historical geology of North America. Systematic review of Precambrian, Palaeozoic, Mesozoic, and Cenozoic stratigraphy and fossils.
Text: Clark and Stearn, Geological Evolution of North America.
Reference Texts: Weller, Stratigraphic Principles and Practice.
Kay and Colbert, Stratigraphy and Life History.
Prerequisite: Geology 230.
Day Division: 1965-66 (lectures and laboratory three hours a week with assignments).
R. W. Yole

Geology 413,* Geomorphology

(Offered as Geography 210, Principles of Geomorphology. See Department of Geography. This course represents a half-course credit only for Geology majors).

Geology 420, Metallic and Nonmetallic Mineral Deposits

The geology, classification, occurrence and formation of mineral deposits. The phase chemistry of common sulphide and oxide systems, and its application to the study of mineral deposits. Eh-pH controls. Introduction to mining methods, diamond drilling, sampling, ore calculations, mineralography, metallurgy and property valuation.

Geology of non-metallic minerals; structural, industrial and chemical minerals; ceramics and refractories; abrasives; fertilizers; gemstones; the fossil fuels; ground water.

Laboratory includes visits to local mines and industrial mineral laboratories.

Text: Bateman, Economic Mineral Deposits.

Reference Text: Lindgren, Mineral Deposits.

Prerequisites: Geology 310, Geology 350.

Day Division: 1965-66 (lectures, laboratories and seminars six hours a week).

W. M. Tupper

Geology 431,* Micropalaeontology

Types of microfossils, their historical sequence and biostratigraphic significance. Micropalaeoecology. Local and regional correlation. Laboratory: examination and identification of microfossils, with special reference to the Foraminifera.

Text: Jones, Introduction to Micropalaeontology.

Reference Texts: Cushman, Foraminifera.

Glaessner, Principles of Micropalaeontology.

Prerequisites: Geology 230 and permission of instructor.

Day Division: 1965-66 (lectures and laboratories five hours a week; assignments to be arranged; first term).

K. Hooper

Geology 452*, Igneous and Metamorphic Petrology

Detailed examination of classical problems in petrology. Principles of phase equilibria and graphical representation of mineral systems. Laboratory: the study of igneous and metamorphic suites, introduction to petrographic calculations, and other advanced laboratory techniques.

Text: Turner and Verhoogen, Igneous and Metamorphic Petrology.

Reference Texts: Bowen, Evolution of the Igneous Rocks.

Harker, Metamorphism.

Barth, Theoretical Petrology.

Prerequisites: Geology 350, Chemistry 210.

Day Division: 1965-66 (seminars and laboratory six hours a week, second term).

J. M. Moore

Geology 463*, Sedimentology

Review of sedimentary processes. Composition, texture, primary structure and origin of the major sedimentary rock types. Dispersal patterns, sedimentary trends, and lithofacies. Laboratory: textural analyses, heavy minerals, statistical analysis of data, and thin-section petrography.

Text: Pettijohn, Sedimentary Rocks, 2nd ed.

Reference Texts: Krumbein and Pettijohn, Manual of Sedimentary Petrography.

Milner, Sedimentary Petrography.

Prerequisite: Geology 350.

Day Division: 1965-66 (lectures and laboratory five hours a week, first term).

R. W. Yole

Geology 480, Chemistry and Physics of the Earth

Physical and chemical properties and characteristics of the earth. Inferred physico-chemical processes active throughout geologic time.
Texts: Mason, Principles of Geochemistry.
Jacobs, Russel, and Wilson, Physics and Geology.
Prerequisites: Chemistry 100, Mathematics 100, Physics 100, Geology 350.
Day Division (first term) and *Evening Division* (second term): 1965-66 (lectures three hours a week).
W. M. Tupper, E. R. Niblett

Geology 481,* Exploration Geophysics

An introduction to the fundamental theory and application of geophysics to economic and structural geology. Methods studied are electrical, gravity, magnetic, radioactive, and seismic. Case history studies integrate the application of the methods.
Text: Dobrin, Introduction to Geophysical Prospecting, 2nd ed.
Reference Texts: Jakosky, Exploration Geophysics.
Parasnis, Principles of Applied Geophysics.
Prerequisites: Physics 100, or permission of the instructor.
Day and Evening Divisions: 1965-66 (combined lectures, labs, or field trips, five hours a week, first term).
P. J. Hood

Geology 482,* Applied Geochemistry

Chemical and physical factors responsible for the distribution and migrations of the elements in the lithosphere, hydrosphere, atmosphere and biosphere; geochemistry applied to mineral exploration; methods of analysis. Laboratory: determination of trace amounts of the common metallic elements in soils and stream sediments; case histories; research problems.
Text: Hawkes and Webb, Geochemistry in Mineral Exploration.
Reference Texts: Mason, Principles of Geochemistry.
Rankama and Sahama, Geochemistry.
Ginzburg, Principles of Geochemical Prospecting.
Sandell, Colorimetric Determination of Traces of Metals.
Prerequisites: Geology 100, 220 (may be taken concurrently), Chemistry 100.
Day Division: 1965-66 (combined lectures and laboratory five hours a week, second term).
W. M. Tupper

Geology 498, Honours Thesis

The B.Sc thesis is to be based on a nonconfidential problem, undertaken either during the summer under adequate supervision, or during the University year in the Ottawa area under the supervision of the student's adviser. Equivalent to one full course.

Graduate Courses

Geology 500

Mandatory: A two year seminar course of one hour weekly or semi-monthly. Problems are presented by graduate students, and discussed by graduates and staff.

152

Geology 505, Mineral Economics

The principles of economics as applied to the mineral industries, and the economic geology of the more significant mineral industries.
Reference Text: AIMME, Economics of the Mineral Industries.
Prerequisites: Geology 420, and Economics 100, or permission of instructor.
Not offered, 1965-66.

Geology 510, Geotectonics

The architecture of the globe.
Reference Texts: To be assigned.
Prerequisites: Geology 310, 350, and 360.
Day Division: 1965-66 (seminars weekly).
F. K. North

Geology 515, Small-scale structures

Detailed study of small-scale structures in rocks of all types.
Not offered, 1965-66.

Geology 520, Advanced Mineral Deposits

Theories of ore deposition are examined in detail.
Text: Bateman, Economic Mineral Deposits.
Reference Texts: Bates, Geology of Industrial Rocks and Minerals.
AIMME, Industrial Minerals and Rocks.
USBM, Mineral Facts and Problems.
Prerequisite: Geology 420.
Not offered, 1965-66.

Geology 525, Advanced Crystallography

Part I—Principles and techniques of X-ray crystallography; interpretation of X-ray photographs and application to the study of minerals. Part II—Crystal structure determinations. Parts I and II are given in alternate years; part II offered in 1965-66.
Reference Texts: To be assigned.
Prerequisite: Geology 220.
Day Division: 1965-66 (lectures and laboratory six hours a week).
G. Y. Chao

Geology 530, Advanced Palaeontology

The morphology, ecology, classification and geological history of selected fossil groups (mainly invertebrate). Problems of invertebrate palaeontology and biostratigraphy.
Reference Texts: To be announced.
Prerequisites: Geology 230; Geology 431 may be taken concurrently.
Day Division: 1965-66 (seminars and laboratory five hours a week).
K. Hooper

Geology 550, Advanced Petrology

The physical and chemical principles of igneous and metamorphic phenomena, with special emphasis on phase equilibria. Discussion and review of modern literature.
Reference Texts: Levin et al., Phase diagrams for Ceramists.
Korzhinskii, Physicochemical Basis of the Analysis of the Paragenesis of Minerals.
Turner and Verhoogen, Igneous and Metamorphic Petrology.
Prerequisites: Chemistry 210, Geology 452.
Day Division: 1965-66 (seminars and laboratory five hours a week).
J. M. Moore

Geology 560, Stratigraphy and Sedimentology

Selected problems in sedimentary geology. The application of modern techniques of stratigraphic, petrologic and statistical analysis. Review and critiques of modern literature.
Reference Texts: Weller, Stratigraphic Principles and Practice.
Krumbein and Sloss, Stratigraphy and Sedimentation.
Potter and Pettijohn, Paleocurrents and Basin Analysis.
Prerequisites: Geology 230, 350, 360, 463.
Day Division: 1965-66 (seminars and laboratory five hours a week).
R. W. Yole

Geology 565, The Fossil Fuels

The geology of coal, petroleum, natural gas and solid hydrocarbons.
Reference Texts: To be assigned.
Prerequisites: Geology 360 and 420
Not offered, 1965-66.

Geology 572*, Instrumental Analysis

The theory and techniques of instrumental methods of analysis as they apply to problems in the earth sciences. Spectrophotometric analysis, colorimetry, fluorimetry, nephelometry, spectrographic analysis, flame photometry, mass spectrometry, X-ray diffraction and fluorescence spectrometry; neutron activation and radiometric analysis; electron microscopy; and digital computors. Laboratory : instrumental exercises; visits to instrumental laboratories in the Ottawa area.
Text: Willard, Merritt, and Dean, Instrumental Methods of Analysis.
Reference Texts: Various reference texts and outside reading.
Prerequisites: Permission of the instructor, Chemistry 250.
Day Division: 1965-66 (lectures, seminars, and laboratory six hours a week, second term).
W. M. Tupper

Geology 580, Advanced Geochemistry

The geochemical classification of the elements; abundance of the elements; periodic table; bonding; hydrolysis; complex ions; colloids; oxidation-reduction; metamorphism; diffusion; phase chemistry of silicate systems; isotopes; metallic mineral deposits. Course continues for two years.
Texts: Reference texts and outside reading.
Prerequisites: Geology 350 and 420; and preferably Chemistry 350.
Evening Division: 1965-66 (seminars weekly or semi-monthly).
R. W. Boyle and W. M. Tupper

Geology 581,* Chemistry of the Earth

The material in Geology 480 at a more advanced level. The basic principles of chemistry as they apply to problems in geochemistry. The chemistry and genesis of igneous, metamorphic and sedimentary rocks. The geochemistry and evolution of the hydrosphere, atmosphere and biosphere. The geochemical cycle.
Reference Texts: Mason, Principles of Geochemistry.
Rankama and Sahama, Geochemistry.
Prerequisites: Geology 350 and preferably Chemistry 350.
Day Division: 1965-66 (lectures three hours a week, first term).
W. M. Tupper

Geology 582,* Physics of the Earth

The gravity, seismology, geomagnetism, and physics of the earth's interior.
Reference Texts: To be assigned.
Prerequisites: Mathematics 100, Physics 100.
Evening Division: 1965-66 (lectures three hours a week, second term).
E. R. Niblett and others

Geology 590, Directed Studies

Directed reading or directed laboratory studies in fields closely related to the graduate student's thesis problem, under the guidance of selected extramural or intramural directors.

Geology 599 (590), M.Sc. Thesis

Equivalent to two full courses.

Geology 699 (595), Ph.D. Thesis

Equivalent to five full courses.

German

Associate Professor;
Chairman of Department — E. M. Oppenheimer
Assistant Professor — Maria Fürstenwald
Lecturer — R. D. Gould
Sessional and Language
Laboratory Lecturer — Anna M. Rosenberg
Sessional Lecturers — R. Aksim, Hildegard Corbet, Gerd Hermodssen,
G. Lemke, Jutta Prager, Ilse Sprung

Major in German

A minimum of five courses (beyond German 15); in addition to German 100 these normally include German 250 and at least one of the composition-conversation series. It is possible to elect German and another subject for a combined major program. Early consultation with the departments concerned is advised.

Honours Courses

The following Honours Programs are offered by the Department: Honours in German and Russian (p. 219), German and English (p. 129), German and French (p. 135). This last combination fulfills the certificate requirements of the Ontario College of Education, with emphasis on all periods of modern German literature and regular opportunity for oral and written practice throughout the program. All three programs are parallel in structure and are designed to serve as a basis for further work in German at the graduate level. In this latter case the student is advised to elect German 331* in his third year.

Ordinarily seven course credits in each of the two languages are required. Provision may be made in the final year for independent study in a particular field of concentration. Regulations governing honours standing are found on pp. 30 and 36.

Language Laboratory facilities are used in German 15 and 100.

Students are urged to use the reading and conversation room in Paterson Hall.

German 15, Elementary German

An introduction to the essentials of German grammar and composition; oral practice. Attendance at classes and laboratory sessions is compulsory. Guidance in the reading of scientific texts is available.
Texts: Fehlau, Fundamental German.
Goedsche, Schweitzer; Einstein. A prose selection from a contemporary author.
Day and Evening Divisions: Annually (four hours, including one laboratory period per week).
Summer Session: 1965.
Members of Department

German 100, Intermediate German

Review and practice in written and spoken German. Readings from modern German literature, including plays of Goethe, Brecht, or Dürrenmatt.

The course will be given in two equivalent versions, A being primarily for students from German 15 and B primarily for students from Ontario Grade 13. The Department reserves the right to assign students to A or B as appropriate.

Texts: Schulz-Syndermeyer, Deutsche Sprachlehre für Ausländer.

Goedsche, Patterns of German conversation.

Kritsch, Modern Erzählungen.

Brecht, Der gute Mensch von Sezuan.

Goethe, Gesamtausgabe (vol. 10).

Prerequisite: German 15 or equivalent.

Day and Evening Divisions: Annually (four hours, including one oral period per week).

Summer Session: 1965.

Members of Department

German 201* (206*), Intermediate Conversation

Work in small groups with special emphasis on every-day German.

Text: Neuse, Heitere Geschichten.

Dictionary.

Prerequisite: German 100.

Day and Evening Divisions: 1965-66 (two hours per week, *both* terms).

Summer 1965.

Maria Fürstenwald and Hildegard Corbet

German 202* (205), Intermediate Composition

Expansion of the active vocabulary within the framework of current prose usage.

Text: Dickens, German for Advanced Students.

Dictionary.

Prerequisite: German 100.

Day and Evening Divisions: 1965-66 (two hours per week, *both* terms).

Summer 1965.

R. D. Gould and Gerd Hermodssen

German 250, German Literature of the 18th Century

The literature of Enlightenment, Storm and Stress, and Early Classicism, with special emphasis on the works of Lessing, Goethe and Schiller.

Text: Killy, Zeichen der Zeit I (Auf dem Wege zur Klassik); others to be announced.

Prerequisite: German 100 or equivalent.

Day Division: 1965-66 (two lectures a week).

Maria Fürstenwald

German 270, German Literature of the Nineteenth Century

Drama, prose fiction, and poetry from around 1830 to the beginnings of Naturalism; principal authors: Keller, Stifter, Heine, Büchner, Grillparzer, Hebbel, Nestroy.

Not offered, 1965-66.

German 280, German Literature of the Twentieth Century

Shorter selections for orientation and detailed treatment of representative texts.
Text: Killy, Zeichen der Zeit IV (Verwandlung der Wirklichkeit); others to be announced.
Prerequisite: German 100 or equivalent.
Evening Division: 1965-66 (two lectures per week).
E. M. Oppenheimer

German 301* (302*), Advanced Conversation

Work in small groups with special emphasis on idiomatic German. Survey of phonetics. Discussion of current issues.
Text: Neuse, Heitere Geschichten.
Dictionary.
Prerequisite: German 201*.
Evening Division: 1965-66 (two hours per week, *both* terms).
Maria Fürstenwald

German 302 (301*), Advanced Composition

Flexibility in the use of German; composition and exercises.
Text: Neuse, Deutscher Sprachgebrauch.
Dictionary.
Prerequisite: German 202*.
Evening Division: 1965-66 (two hours per week, *both* terms).
R. D. Gould

German 331*, Medieval Language and Literature; History of the Language I

Prerequisite: German 250 or 302* or permission of Department.
Day Division: 1965-66.
Jutta Prager

German 341*, Early Modern German Literature (1500-1700); History of the Language II

This course covers study of selected literary texts of the period and the history of the language proper including a survey of phonetics.
Texts: Schöne, Barock, Die deutsche Literatur.
Texte und Zeugnisse III.
Reference Texts: Priebsch and Collinson. Bithell, Bach.
Prerequisite: German 250 or permission of Department.
Day Division: 1965-66.
Maria Fürstenwald

German 350 [260], Classicism and Romanticism (1790-1830)

German Classicism with particular reference to Schiller and Goethe; Faust II.
Romanticism, illustrated by the works of Tieck, Novalis, Brentano and others.
Prerequisite: German 250 or permission of Department.
Texts: Goethe, Faust; Poems.
Schiller, Wallenstein.
Kleist, Penthesilea; Prinz Friederich von Homburg.
Brink, Deutsche Gedichte der Romantik.
Märchen der deutschen Romantik.
Killy, Zeichen der Zeit II.
Day Division: 1965-66 (three hours per week).
R. D. Gould

German 490, Tutorial on selected topic

Primarily for honours students in their final year. A genre, an author or a group of
authors will be selected; methods of literary criticisms are considered.
Day Division: 1965-66 (hours to be arranged).
Members of Department

History

Professors	David M. L. Farr, Fernand Ouellet, Marcel Trudel
Associate Professor:	
Chairman of Department	Gordon S. Couse
Associate Professors	Desmond G. Bowen (on leave of absence, 1965-66), Stanley R. Mealing, Vaclav Mudroch (on leave of absence, 1965-66), H. Blair Neatby
Assistant Professors	J. Nicoll Cooper, Michael G. Fry, Robert B. Goheen, Naomi E. S. Griffiths, T. Murray Hunter, Peter J. King, John W. Strong
Lecturer	Mary J. Taylor
Sessional Lecturers	Clifford J. Berschneider, Jaroslav A. Boucek, Ronald Grantham, J. Keith Johnson, William G. Ormsby

Major in History (Three Years)

The course pattern of all students majoring in History must be approved each year by a member of the Department before registration is completed.

Students majoring in History are to take seven History courses, as follows:

(a) one course in the first year, preferably History 115;

(b) four courses, two from each of any two of the following groups:
   i) Europe to 1715: History 200 or 201, 210, 215, 257;
   ii) Europe since 1715: History 260, 315, 365, 380;
   iii) Great Britain and the Commonwealth: History 257, 353, 358, 370;
   iv) North America: History 230, 235, 240, 325;

(c) any two courses for which the prerequisites have been filled.

Courses offered by other departments may be counted as History courses, with the approval of the History Department.

History majors may, if they receive the permission of the Department, substitute courses numbered 400 or higher for courses listed above. Permission will not be given to students whose History grades are lower than B.

Every student majoring in History must obtain a grade of C or better in the History courses of the first year and must thereafter maintain C standing (a minimum grade-point average of 4.0) in History courses.

A combined major in History and another subject shall ordinarily include five courses in History, including one in the first year. Students must consult both departments for regulations governing combined programs.

Honours in History (Four Years)

The Department offers an Honours program in the following fields: European history, British and Commonwealth history, Canadian history, American history.

Candidates for the Honours B.A. are required to complete twenty courses beyond Senior Matriculation or the Qualifying University Year. The first-year program is that required for the Honours program in the Social Sciences (p. 37) or that required for the Pass Arts course (p. 34), including History 115 in either case. The whole of an Honours candidate's program must be approved by the History Department.

Candidates for Honours in History will complete *ten* courses in History, as follows:

(a) in the first year, History 115.

(b) three courses, including at least one numbered 400 or higher, from one of the following special fields:
   i) European (History 215, 260, 315, 365, 380, 405* and 406*)
   ii) British and Commonwealth (History 257, 358, 456, 473)
   iii) Canadian (History 230, 235, 325, 430, 443)
   iv) American (History 235, 240, 440, 443).

(c) three courses approved by the Department, only one of which may fall within the candidate's special field.

(d) in the fourth year, History 488 and either History 499 alone or History 490 together with one other course numbered 400 or higher.

If a candidate elects to present an Honours research essay (History 499, equivalent to two courses), the subject for study will be selected in consultation with the Department and a supervisor arranged. The candidate will be examined orally on his thesis.

If a candidate elects an oral examination in a special field (History 490, equivalent to one course), a supervisor will be arranged. The candidate will be examined in one of the four fields listed above.

Two senior courses must also be taken in a minor field—Economics, English, Geography, Political Science or another subject approved by the History Department.

Candidates will be required to show a proficient reading knowledge of at least one language other than English, the choice to depend upon the candidate's special field.

In determining the class of an Honours candidate's degree, the Department will count the marks on all History courses, marks on 400 courses being given double weight.

For information about preparation to enter the Ontario College of Education, and the requirements for the Interim High School Assistant's Certificate, Type A, students are advised to consult the Registrar.

Combined Honours

Candidates who wish to do so may take combined Honours in History and another discipline, the general rule being that seven courses must be taken in each subject and that both departments must approve the candidate's program. Candidates intending to combine History and Political Science should take History 115 or Political Science 100 (or preferably both) in the first year.

Graduate Studies

The Department offers work leading to the degree of Master of Arts in History in fields for which adequate source materials are available in Ottawa. Candidates entering the M.A. program must have an Honours degree in History or its equivalent in both content and standing. Candidates holding a Pass degree and no further training will normally be required to take a qualifying year before being admitted into the M.A. program. The Department will not ordinarily entertain applications from candidates whose undergraduate work has been done at Carleton.

For general regulations concerning admission, standing, time limitation and theses, see pp. 66-68.

M.A. candidates will undertake the following course of study:

1. History 488 (The Philosophy of History). A candidate who has already taken this course or its equivalent may, with the Department's approval, substitute another course numbered 400 or above.
2. History 530 (British North America).
3. History 533 (Canada since 1867).
4. History 599 (Thesis).

Candidates will also be required to show a reading knowledge of a language other than English, the choice to depend on the field of the candidate's thesis.

History 10, Main Directions in Modern History

This course will provide a survey of the forces which since 1870 have shaped the growth of world civilization.

Day Division: Annually (three hours a week).
Evening Division: 1965-66 (lectures two hours a week, group discussion monthly).
T. M. Hunter and R. Grantham

History 100, An Introduction to Western Civilization

This course will aim at an explanation of the present Western way of life, with its problems, as the outcome of a process of civilization.
Day Division: Annually (three hours a week).
G. S. Couse and T. M. Hunter

History 115, Civilization during the Middle Ages

This course will discuss the development of the civilization which characterized the West from the decline of the Roman Empire until the Renaissance. Students who elect History as their major or honours subject are required to take this course rather than History 100.
Day Division: Annually (three hours a week).
Summer, 1965 (ten hours a week).
Mary Taylor

History 200, Greece in the Ancient World

(Offered in the Department of Classics as *Classical Civilization 200*. See notation there.)
Day Division: 1965-66 (two hours a week).

History 201, Rome in the Ancient World

(Offered in the Department of Classics as *Classical Civilization 201*. See notation there.)
Evening Division: 1965-66 (two hours a week).

History 210, The Judaeo-Christian Tradition in Western History

A study of the influence of Judaeo-Christian thought and institutions in the development of Western European civilization. (This course is listed also as Religion 210).
Prerequisite: Permission of the Department.
Not offered, 1965-66.

History 215, Western Europe from the Renaissance to the Eighteenth Century

A study of the development of political and social institutions, thought, religion, and culture from the decline of medieval Europe to the beginning of the Age of Absolutism. This course will examine the influence of intellectual and religious revolution upon the course of Western civilization during the Renaissance and Reformation periods.
Prerequisite: History 115 or permission of the Department.
Day Division: Annually (three hours a week).
R. B. Goheen

History 225, Economic History

(Offered in the Department of Economics as *Economics 225*. See notation there).
Day Division: 1965-66 (lectures two hours a week).

History 230, Canada from 1791

The political, economic and social development of the British North American colonies of 1791 to the Canada of today. This course is intended for students majoring in History. It may not be taken for credit in addition to History 231.
Prerequisite: Permission of the Department.
Day Division: **Annually (three hours a week).**
Evening Division: Summer, 1965 (five hours a week).
H. B. Neatby, F. Ouellet and W. G. Ormsby

History 231, History of Canada

The history of Canada from the development of New France to the mid-twentieth century. This course is intended for students not majoring in History. It may not be taken for credit in addition to History 230.
Prerequisite: Permission of the Department.
Evening Division: 1965-66 (three hours a week).
J. K. Johnson

History 235, History of North America in the Colonial Period

An introduction to the history of Canada and the United States. The development of the Spanish, British, and French empires in North America will be considered.
Prerequisite: Permission of the Department.
Day Division: **Annually (three hours a week).**
S. R. Mealing and P. J. King

History 240, History of the United States of America

This course will consider the history of the United States in the national period, emphasizing political and economic factors.
Prerequisite: Permission of the Department.
Day Division: 1965-66 (three hours a week).
Summer, 1965 (ten hours a week).
P. J. King

History 257, The Tudors and Stuarts, 1485-1714

This course will consider the major currents in sixteenth- and seventeenth-century British history, whether social, economic, political, religious, or intellectual.
Prerequisite: History 115 or permission of the Department.
Day Division: 1965-66 (three hours a week).
R. B. Goheen

History 260, History of Russia and the U.S.S.R.

A survey of Russian history from Kiev to the present, with emphasis on the period since the reign of Peter the Great.
Prerequisite: History 100 or 115, or permission of the Department.
Day Division: 1965-66 (three hours a week).
Summer, 1965 (ten hours a week).
J. W. Strong

History 315, History of Modern Europe, 1715-1919

This course will be concerned primarily with the French Revolution and its aftermath in the general history of nineteenth-century Europe.
Prerequisite: History 100 or 115, or permission of the Department.
Day Division: Annually (three hours a week).
Evening Division: 1965-66.
Summer, 1965 (ten hours a week).
M. G. Fry and Naomi Griffiths

History 325, The Economic Development of Canada

(Offered in the Department of Economics as *Economics 325*. See notation there).
Evening Division: 1965-66 (lectures two hours a week).
Summer, 1965 (five hours a week).

History 353, English Social History

This course is intended primarily to provide a background for the study of English literature.
Prerequisite: History 100 or 115, or permission of the Department.
Day Division: 1965-66.
J. N. Cooper

History 358, British History from 1714

The main emphasis of this course will fall on the nineteenth century, the major currents of which it will consider in their effect on Great Britain.
Prerequisite: History 100 or 115, or permission of the Department.
Day Division: 1965-66 (three hours a week).
J. N. Cooper

History 365, History of Eastern Europe

A survey of Eastern European history from the early eighteenth century to the present, with emphasis on the histories of Poland, Czechoslovakia and Hungary.
Prerequisite: Permission of the Department.
Evening Division: 1965-66 (three hours a week).
J. A. Boucek

History 370, British Expansion Overseas and the British Empire

This course will consider the development of the British Empire and Commonwealth from the American Revolution to the present day.
Prerequisite: Permission of the Department.
Not offered, 1965-66.

History 380, An Introduction to the History of International Relations, 1900-1939

The central theme of this course will be the attempt to establish a lasting peace after the First World War and the failure of that attempt.
Prerequisite: Permission of the Department.
Day Division: 1965-66.
Summer, 1965.
M. G. Fry and C. J. Berschneider

History 385, Modern History of the Far East

A political and intellectual history of East Asia in the nineteenth and twentieth centuries, with emphasis on China and Japan.
Prerequisite: Permission of the Department.
Day Division: 1965-66 (three hours a week).
J. W. Strong

History 405*, Medieval Institutions—Selected Problems

This course will examine in detail those institutions of the Middle Ages which moulded the mind of the medieval man. The medieval papacy, heresy, manorialism, rise of the towns, forms of commerce, political theory, law, popular uprisings, historical literature, will be examined in the light of the existing sources.
Prerequisite: History 115, permission of the Department.
Day Division: 1965-66 (Fall Term: three hours a week).
Mary Taylor

History 406*, Selected Problems in the History of Modern Institutions

This course will pay particular attention to the emergence of the state during the seventeenth century, and to the relation between the ideas of political thinkers and their own era.
Prerequisite: History 115, permission of the Department.
Day Division: 1965-66 (Spring Term: three hours a week).
Naomi Griffiths

History 429, Selected Problems in Greek and Roman History

(Offered in the Department of Classics as Classical Civilization 429. See notation there.)
Day Division: 1965-66 (two seminars a week).

History 430, Selected Problems in Canadian History

A seminar, primarily for students in Honours History.
Prerequisite: History 230, permission of the Department.
Day Division: 1965-66 (three hours a week).
S. R. Mealing and F. Ouellet

History 431, New France

A seminar primarily for Honours students.
Prerequisite: Permission of the Department.
Day Division: 1965-66.
M. Trudel

History 440, Selected Problems in American History

A seminar, primarily for Honours students, in which selected topics in the history of the United States during the nineteenth and twentieth centuries will be considered.
Prerequisite: History 240, permission of the Department.
Day Division: 1965-66 (three hours a week).
P. J. King

History 443, Canada-United States Relations

This course will trace the development of Canadian-American relations from the end of the eighteenth century, with particular attention to the period since 1871.
Prerequisite: Permission of the Department.
Day Division: 1965-66.
D. M. L. Farr

History 456, Medieval Britain

This course will examine the development of medieval English institutions from the Anglo-Saxon invasions. Attention will also be given to the language and literature of medieval England.
Prerequisite: History 115 or permission of the Department.
Day Division: 1965-66.
Mary Taylor

History 473, The British Commonwealth of Nations

This course will deal with the history, structure and role of the Commonwealth in the twentieth century.
Prerequisite: Permission of the Department.
Not offered, 1964-65.

History 488, The Philosophy of History

This is a seminar in which major historical writings and works in the philosophy of history will be examined.
Prerequisite: Permission of the Department.
Day and Evening Division: Annually (three hours a week).
G. S. Couse

History 490, Honours Tutorial

Supervised study in a special field, in preparation for an oral examination.
Prerequisite: Permission of the Department.
Day Division: Annually (tutorial hours arranged).
Members of the Department

History 499, Honours Research Essay

Required of candidates for Honours in History at the end of their fourth year. The subject for research will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be orally examined upon his essay after presentation.
Day Division: Annually (tutorial hours arranged).
Members of the Department

History 530, British North America, 1783-1867

A seminar in the history of the British North American colonies from 1783 to 1867. Assignments will be required, together with a written examination.
Evening Division: 1965-66 (three hours a week).
S. R. Mealing and F. Ouellet

History 533, Canada since 1867

A seminar in the history of Canada after 1867. Assignments will be required, together with a written examination.
Day Division: 1965-66 (three hours a week).
H. B. Neatby

History 590, Historical Method—Graduate Studies

This course will cover the same subjects as History 490, except that it will be directed towards the preparation of a graduate thesis in History.
Day and Evening Divisions: Annually (tutorial hours arranged).
Members of the Department

History 599, Thesis—Graduate Studies

A thesis, involving a substantial historical investigation, will be the principal requirement for the Master's degree in History. The subject will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be orally examined after presenting his thesis.
Day and Evening Divisions: Annually (tutorial hours arranged).
Members of the Department

Journalism

Professor; Director of the
School   Wilfrid Eggleston
Associate Professor   W. H. Kesterton
Assistant Professor   T. Joseph Scanlon
Sessional Lecturers   Frances Oakes Baldwin, Phyllis Wilson, Bruce Yemen
Seminar Leaders   Norman DePoe, W. B. Herbert, John Marlyn,
Campbell McDonald

Journalism 210, Introduction to Journalism

A broad survey of the whole field. Opportunities and personal requirements in various branches of the media. A history of journalism, emphasizing as major themes: technological developments, the growth of press freedom and press responsibility, studies of representative journals and journalists, mainly Canadian, British and American. Discussion of freelance writing, with practical exercises in the magazine article, newspaper feature, dramatic script, short story. Marketing of manuscripts.
Recommended Reading: Bond, An Introduction to Journalism.
Siebert, Peterson and Schramm, Four Theories of the Press.
Day Division: Annually (lectures and practical exercises, four hours a week).
W. H. Kesterton and Frances Baldwin

Journalism 220, Fundamentals of Reporting

The nature of news values; how to recognize and collect news; how to analyze, organize and report it. Interviewing and news gathering. This is mainly a practical course, based on assignments in reporting and other forms of writing.
Recommended Reading: Neal, News Gathering and News Writing.
Day Division: Annually (lectures and practical exercises, four hours a week).
B. Yemen and T. J. Scanlon

Journalism 330, Editing

Copy-reading and head-writing. This course will provide practical instruction in the duties and responsibilities of the deskman, and training in reading copy and writing headlines; the use of illustrations. The responsibilities and opportunities of the editor in his community will be discussed; the press and society; semantics; the ethics of journalism; freedom of the press; the law and the press; censorship in war and peace; news policy, the sources and interpretation of foreign news.
Text: Bastian, Case, and Baskette, Editing the Day's News.
Prerequisite: Journalism 210.
Day Division: Annually (lectures three hours a week).
W. H. Kesterton

Journalism 340, Interpretative Journalism

This is mainly a practical course based on community assignments aimed at identifying and interpreting the news. Coverage extends to politics and governmental activity, both civic and federal, and to the specialized fields of international affairs, business, labor, science, sports, the drama, film, music, art and book review. The course includes development of contacts and sources, methods of research, use of a newspaper library and morgue; and work on a daily newspaper.
Text: MacDougall, Interpretative Reporting.
Prerequisite: Journalism 220.
Day Division: Annually (lectures and practical exercises averaging four or five hours a week).
Phyllis Wilson and T. J. Scanlon

Journalism 350, Career Seminar in Journalism

Round table discussions with guest speakers. Each student in Journalism 350 will be required to choose a current topic of Canadian interest for extensive live research and study as preparation for an oral report, which will be followed by questioning from instructor and group. Vocational guidance. Groups will be arranged whenever possible to meet the needs of those who have special interests or ambitions.
Prerequisite: For final year Journalism students.
Day Division: Annually (round table sessions, two hours a week, plus special seminars).
Members of the Department

Journalism 410, The Press in Modern Society

A brief historical survey of the rise of the press as an influential agency in western society is followed by a more detailed examination of the ownership and control of the press today, and the consequences and implications. Theories of the press. Public Opinion. Propaganda. Freedom of the press in Canada and around the world.
Text: To be announced.
Prerequisite: For students enrolled in the one-year graduate course.
Day Division: Annually (lectures, discussions and projects averaging three hours a week).
W. Eggleston and W. H. Kesterton

Journalism 430, Editorial Practice and Policy

Editing and the tasks and roles of the editor. Some practical work in copyreading and headline writing. The use of typography and illustrations. The responsibilities and opportunities of the editor and publisher. Editorial writing. The law of the press. The ethics of the press. Censorship. Sources of foreign news. Copyright. Publishing problems.
Text: Bastian, Case and Baskette, Editing the Day's News.
Prerequisite: For students enrolled in the one-year graduate course.
Day Division: Annually (lectures and practical exercises, three hours a week).
W. Eggleston

Journalism 440, Modern News Reporting

The theory and practice of covering the news of the day in all the media. This course includes a series of practical reporting exercises of a realistic and increasingly complex nature. Reporting "in depth". Coverage of public affairs, and other specialized areas of human activity. Students in this course will be given opportunity to work in Ottawa newsrooms if they lack practical background.
Text: MacDougall, Interpretative Reporting.
Recommended Reading: Copperud, Words on Paper.
Prerequisite: For students enrolled in the one-year graduate course.
Day Division: Annually (workshops and practical exercises averaging five to six hours a week).
T. J. Scanlon

A series of seminars and round table discussions will be held on a number of the leading news topics of the day. Stress will be placed on those perennial problems certain to crop up in the years ahead. Each student will be responsible for lengthy investigations and reporting of one or more of these current issues.

Prerequisite: For students enrolled in the one-year graduate course.

Day Division: Annually (seminars of two hours a week and practical projects of varying length).

W. Eggleston and others

Mathematics

Professor; Chairman of the Department	D. K. Dale
Professors	P. R. Beesack (on leave of absence, 1965-66), M. S. Macphail, F. H. Northover
Associate Professors	R. J. Semple, D. W. Sida
Assistant Professors	C. W. L. Garner, J. E. Graham, E. J. Norminton, B. M. Puttaswamaiah, M. Rahman, G. Tanyi
Lecturers	R. B. Gamble, Marianne Helfenstein, B. G. Nemes
Sessional Lecturers	R. L. Beatty, I. Fellegi, J. C. Gardner, G. LeSueur, C. Moser, Barbara Turner

Major in Mathematics

Basic Requirements

For B.A. Successful completion of First year with a standing of at least C in Mathematics 100.[1]

For B.Sc. Successful completion of at least four courses of First year, with a grade of C— or better in two courses one of which must be in Mathematics 100.[1]

Mathematics Major Requirements

1. A total of ten courses beyond the basic requirements including:

(a) At least five courses in Mathematics, including Mathematics 200 and 210. At least two of Mathematics 255*-256*, 307*-308*, 310, 320, 341, and one additional Mathematics course numbered 300 or higher.

(b) *For B.A.* Five additional courses. Two must be in a field other than Mathematics (three, if one was not taken in the First year); and at least one must be selected from Biology 100, Chemistry 10 or 105, Geology 100, or Physics 10 or 100.

For B.Sc. Five additional courses. Two must be in a Science field other than Mathematics (three, if one was not taken in the First year); and at least two must be selected from courses in the Humanities or Social Sciences.

2. Of the total courses (fifteen) at least eight must be numbered 200 or higher.

3. All course selections must be approved by the Mathematics Department.

4. The B.Sc. candidate must pass a reading knowledge examination in one of French, German, or Russian.

Students entering First year who plan to take a major or honours in Mathematics should obtain the advice of the Department as to their choice of courses.

[1]With satisfactory standing in his course program and a grade of B— or better in Mathematics 101, a student may be permitted by the Department to major in Mathematics after the completion of additional readings in Mathematics.

Honours in Mathematics

(For information regarding preparation for admissions to the Ontario College of Education for the Interim High School Assistant's Certificate, Type A, students are invited to consult the Registrar).

Basic Requirements:

Successful completion of First year with a standing of at least B in Mathematics 100 and a G.P.A. of 6.0 in the First year.

Honours Requirements

1. At least 15 courses beyond the basic requirements, including:

(a) At least 9 courses in Mathematics including Mathematics 200, 210, 300, 310, 341, 350 and 307*. The remaining course requirements in Mathematics must be selected from courses numbered 300 or higher.

(b) Six additional courses, at least 4 of which are numbered 200 or higher. Of these 6 courses, at least 2 must be in a field other than Mathematics, and at least 2 must be from the Humanities or Social Sciences.

2. All course selections must be approved by the Mathematics Department.

3. The B.Sc. candidate must pass a reading knowledge examination in one of French, German or Russian.

4. During the Fourth year candidates will be required to present a report and deliver a short lecture on some chosen topic or topics in the field of mathematics based on directed studies undertaken during the preceding summer.

Combined Honours in Mathematics and Physics

Candidates who wish to take a B.Sc. degree with combined honours in Mathematics and Physics should take eighteen courses beyond first year.

Typical Pattern (minimum Departmental requirements)

Year I:
Physics 100
Chemistry 100
Mathematics 100
Biology 100 or Geology 100
One of: Classical Civilization 200 or 201
English 100
Philosophy 100

Year II:
Physics 210
Physics 230
Mathematics 200
Mathematics 210
One Humanity
One Humanity (winter or summer course)

Year III:
Physics 307*
Physics 317*
Physics 341*
Physics 360
Mathematics 300
Mathematics 307*, 308*
Mathematics 310
Mathematics 341

Year IV:
Physics 407*
Physics 437*
Physics 447*
Physics 476
Mathematics 403
Physics 499 or Mathematics 490
One Mathematics or Physics Course

Candidates for Combined Honours degrees must show a reading knowledge of French, German or Russian.

During the vacation between Year II and Year III, students will be required to undertake directed reading. During Year IV comprehensive examinations or special projects are given in Physics and Mathematics.

Combined Honours in Economics and Mathematics

Students will have a choice of a combination of Economics and Pure Mathematics or Economics and Statistics. In either case, they will take seven courses in Economics and eight in Mathematics and meet the two departments' requirements for comprehensive examinations. Each year's program should be determined in consultation with the two departments.

The Economics courses taken shall be: Economics 100, 200, 210, 225, or 325, 400 or 492, 498 and one other in category four. The mathematics courses taken in the first two years shall be Mathematics 100, 200, 210, 255*, and 256*. Those of the final two years shall be either Mathematics 300, 310, 307* and 308* or 407* and one other in the 300 or 400 series, or Mathematics 350, 355* and 358* and 356* and 357*, and one other in the 300 or 400 series.

Requirements for Graduate Degrees

Master of Science or Arts

1. For admission to the degree program, candidates must have the equivalent of an honours degree in mathematics with at least second class honours standing. Candidates with a pass degree may, with the permission of the department, be admitted to a qualifying year to attain the above requirement.
2. The course requirements are:
a) three or four courses and a suitable thesis or
b) five courses, without a thesis.
All courses must be selected from the 400 and 500 series and at least half of them must be in the 500 series.
3. The candidate will be required to give satisfactory evidence of his ability to read mathematical literature in one of French, German, or Russian.
4. Each candidate will be required to take a comprehensive examination covering appropriate fields in mathematics and a final oral examination on the subject of his thesis and related fields.

Doctor of Philosophy

1. For admission to the degree program, candidates must have the equivalent of a master's degree in mathematics.
2. The course requirements are a minimum of three courses in the 500 series and a suitable thesis.
3. The candidate will be required to give satisfactory evidence of his ability to read mathematical literature in two languages (other than English) as specified by the Department.
4. Each candidate will be required to take a comprehensive examination covering appropriate fields in mathematics and a final oral examination on the subject of his thesis and related fields.

All graduate programs must meet the approval of the department.

Mathematics 16*, Algebra

Sets, field properties of the system of real numbers, mathematical induction, progressions; binomial theorem, functions, polynomial functions, synthetic division, remainder theorem, complex numbers; exponential, logarithmic, composite and inverse functions. (Half course).
Text: Dolciani, Beckenback, Jurgensen, Donnelly, Wooton: Modern Introductory Analysis.
Prerequisite: Taken concurrently with Mathematics 36*.
Day Division: Annually (lectures two hours a week, plus one hour problems period on alternate weeks, both terms).
Evening Division: Annually (as above).

Mathematics 36*, Trigonometry and Analytic Geometry

Ordered pairs of numbers, vectors, sine and cosine functions defined on the unit circle, other circular functions, trigonometric functions, geometric theorems, circles, ellipses, parabolas, hyperbolas, transformations in the plane, translations, rotations. (Half course).
Text: Dolciani, Beckenback, Jurgensen, Donnelly, Wooton: Modern Introductory Analysis.
Prerequisite: Taken concurrently with Mathematics 16*.
Day Division: Annually (lectures two hours a week, plus one hour problems period on alternate weeks, both terms).
Evening Division: Annually (as above).

Mathematics 100, Introductory Calculus and Algebra

Functions, limits and derivatives, differentiation of algebraic functions, applications, the definite integral, special functions, formal integration, approximations, Taylor's Theorem with Remainder.
Algebra:
Non-Engineering: Sets, number systems, matrix algebra, vector geometry, vector functions, probability theory.
Engineering: Sets, matrix algebra, Boolean Algebra, vector and analytic geometry, spherical trigonometry, probability theory.
Text: To be announced.
Prerequisite: An average grade of 'C' or better in Mathematics 16* and 36* or equivalent courses.
Day Division: Annually (lectures five hours a week).
Evening Division: Annually (lectures five hours a week).
Members of Department
Summer 1965 (lectures six hours a week).

Mathematics 101, Introductory Mathematics

Elements of set theory, analytic geometry, differential calculus, maxima, minima and rate problems, integral calculus, approximations, simple first order differential equations, probability, elements of linear algebra.
Text: To be announced.
Prerequisite: Mathematics 16* and 36* or equivalent (at least algebra and trigonometry).
Day Division: Annually (lectures four hours a week).

Mathematics 130, General Mathematics

Deductive nature of mathematics; the axiomatic method; selected topics such as probability and theory of games with application to social and economic problems. Introduction to calculus and to recent developments in mathematics.
Text: Allendoerfer and Oakley, Principles of Mathematics.
Reference: Kemeny, Snell and Thompson, Finite Mathematics.
Day Division: Annually (lectures three hours a week).

Mathematics 200, Intermediate Calculus and Differential Equations

Three dimensional analytic geometry and vectors, partial differentiation, tangent planes, Jacobians, exact differentials and line integrals, multiple integrals, Green's theorem in the plane. Differential equations, first and second order linear equations, operators applied to n-th order and linear systems, Laplace transforms, Newtonian mechanics, applications of multiple integration.
Texts: Johnson and Kiokemeister: Calculus.
Prerequisite: Mathematics 100.[2]
Day Division: Annually (lectures four hours a week).
Evening Division: 1965-66 (lectures four hours a week).
Summer, 1965 (lectures five hours a week in evening division).

[2] With satisfactory standing in his course program and a grade of B— or better in Mathematics 101, a student may be permitted by the Department to take Mathematics 200.

174

Mathematics 201, Intermediate Calculus and Algebra

Differential calculus of functions of several variables, differential equations, first and higher order linear equations, multiple integration, linear algebra, vector spaces of n-tuples of real numbers, elements of linear programming.
Text: To be announced.
Prerequisite: Mathematics 100 or 101.
Day Division: Annually (lectures four hours a week).

Mathematics 210, Linear Algebra

Vectors and vector spaces; matrix algebra; transformation of co-ordinates and linear transformations in a vector space; reduction of quadratic forms; applications in geometry.
Text: Paige and Swift: Elements of Linear Algebra.
Prerequisite: Mathematics 100.
Day Division: Annually (lectures three hours a week).
Evening Division: Annually (lectures three hours a week).
Summer, 1965 (lectures five hours a week in evening division).

Mathematics 255*, Introduction to Statistical Analysis I

Frequency distributions; classification of data; moments of a distribution; measures of central tendency, dispersion, skewness, kurtosis; probability theory, probability density functions—binomial, normal and Poisson distributions, mathematical expectation, applications. (Half course). (See also Economics 220, Statistical Methods in the Social Sciences).
Text: To be announced.
Prerequisites: Mathematics 16* and 36* or equivalent courses.
Day Division: Annually (lectures three hours a week, first term).
Evening Division: Annually (lectures three hours a week, first term).
Summer, 1965 (lectures five hours a week, in evening division, first half of summer term, lectures five hours a week in day division).

Mathematics 256*, Introduction to Statistical Analysis II

Statistical inference; applications of the "Z", "t", "F" and "chi-squared" distributions; confidence limits; experimental designs; randomized block, Latin square designs; enumeration statistics; contingency test; least squares analysis, simple regression and correlation analysis.
(Half course).
Text: Dixon and Massey, Introduction to Statistical Analysis.
Prerequisite: Mathematics 255*.
Day Division: Annually (lectures three hours a week, second term).
Evening Division: Annually (lectures three hours a week, second term).
Summer, 1965 (lectures five hours a week in evening division, second half of summer term).

Mathematics 300, Introduction to Analysis: Advanced Calculus

The real number system, sequences and series, geometry and topology in Euclidean spaces, real and vector valued functions in Euclidean spaces, limits, continuity, differentiability, transformations, Riemann integrals in Euclidean spaces; improper Riemann integrals, convergence and uniform convergence of sequences and series of functions.
Text: To be announced.
Prerequisites: Mathematics 200 and 210.
Day Division: Annually (lectures three hours a week).

Mathematics 305*, Functions of a Complex Variable

Analytic functions: contour integration: residues: conformal transformations: Laplace transform.
References: Kreyszig: Advanced Engineering Mathematics.
Churchill: Complex Variables and Applications.
Prerequisite: Mathematics 200 or 201.
Day Division: Annually (lectures three hours a week, one term).
Summer, 1965 (lectures three hours a week in evening division).

Mathematics 306*, Mathematical Methods I

Series solution of ordinary differential equations: solution of partial differential equations of mathematical physics: special functions: Fourier analysis: boundary value problems.
References: Kreyszig: Advanced Engineering Mathematics.
Churchill: Fourier Series and Boundary Value Problems.
Prerequisite: Mathematics 200 or 201.
Day Division: Annually (lectures three hours a week, one term).

Mathematics 307*, Functions of a Complex Variable

Analytic functions, contour integration, residue calculus. (Half course).
Text: Churchill: Complex Variables and Applications.
Copson: Functions of a Complex Variable.
Prerequisite: Mathematics 200 (non-engineering students).
Day Division: Annually (lectures two hours a week, both terms).

Mathematics 308*, Mathematical Methods I

The second order differential operator, Laplace transforms, series solutions of differential equations of Mathematical Physics, special functions, generalized Fourier Analysis, boundary value problems. (Half course).
Text: Rainville: Intermediate Differential Equations.
Prerequisite: Mathematics 200 (non-engineering students).
Day Division: Annually (lectures two hours a week, both terms).

Mathematics 310, Modern Algebra I

Introduction to basic concepts of modern algebra, groups, rings, and homomorphisms, integral domain, field, number systems, vector spaces.
Text: To be announced.
Prerequisite: Mathematics 210.
Day Division: 1965-66 (lectures three hours a week).

Mathematics 320, Modern Geometry I

Advanced Euclidean geometry, symmetries, isometries, inversion, polyhedra, applications of algebra, plane projective geometry over a general field.
Text: Coxeter, H. S. M.: Introduction to Geometry.
Prerequisite: Mathematics 210.
Day Division: 1965-66 (lectures three hours a week).

Mathematics 360, Numerical Analysis

Finite differences and interpolation, systems of linear equations and matrix inversion, difference equations, error analysis, eigenvalue problems, relaxation methods.
Texts: To be announced.
Prerequisites: Mathematics 200 and 210; or 201 and the permission of the Department.

Mathematics 341, Applied Mathematics I

A study of the methods and techniques of applying mathematical concepts and models; with special reference to vector analysis; dynamics of a particle and rigid body, statics, mechanics of continuous media.
References: Rutherford, Classical Mechanics.
Becker: Introduction to Theoretical Mechanics.
Spiegel, Vector Analysis.
Prerequisite: Mathematics 200.
Day Division: 1965-66 (lectures three hours a week).

Mathematics 350, Statistical Theory I

Probability distributions, discrete and continuous, univariate and multivariate, expected value; moment generating functions; limit theorems, law of large numbers, othogonal linear functions, derived sampling distributions; fundamentals in estimation procedures; maximum likelihood; tests of hypotheses; power functions; applications.
Text: To be announced.
Prerequisites: Mathematics 200, 210 and 256*. (256* not required of Honours Mathematics students).
Day Division: Annually (lectures three hours a week).

Mathematics 355, Statistical Analysis III*

Application of hypergeometric, binomial, normal Poisson, "t", "F" and "chi-squared" distributions; sampling inspection; sequential analysis; power of a test; quality control. (Half course).
Text: To be announced.
Prerequisite: Mathematics 256*.
Not offered, 1965-66.

Mathematics 356, Sampling Theory*

Theory of sampling from finite populations; random, systematic, stratified, and multi-stage sampling, simple, ratio, and regression estimates; optimum allocations; relative efficiencies of different methods, applications. (Half course).
Text: Cochran, Sampling Techniques.
Prerequisite: Mathematics 256*.
Day Division: 1965-66 (lectures three hours a week, first term).

Mathematics 357*, Experimental Designs

General method of statistical analysis, concepts of design; randomization, replication, algebraic models, orthogonal comparisons; confounding; missing plot techniques; analysis for randomized block, Latin square, split plot; and factorial designs; applications. (Half course).
Text: To be announced.
Prerequisite: Mathematics 256*.
Day Division: 1965-66 (lectures three hours a week, second term).
Summer, 1965 (lectures six hours a week in day division).

Mathematics 358*. Correlation and Regression Analysis

Least squares; simple linear and curvi-linear regression; multi-variate regression; multiple and partial correlation; time series; index numbers; growth curves—Gompertz, Logistic; simple models. (Half course).
Text: To be announced.
Prerequisite: Mathematics 256*.
Not offered, 1965-66.

A selection from the following courses in the 400 series will be offered if there is sufficient demand.

Mathematics 400, Differential Equations

Theory of ordinary and partial differential equations.
Text: Burkill, Theory of Ordinary Differential Equations.
Prerequisites: Mathematics 300, 307*, 308**.

Mathematics 403, Mathematical Methods II

Advanced theory of ordinary and partial differential equations. Methods of approximation to solution of ordinary differential equations, including approximation by a convergent series, iterative methods. Asymptotic expansions: the method of steepest descents and the WKB method. Theory and application of Laplace and other integral transforms. Introduction to integral equations and to calculus of variations.
Texts: Burkill, Theory of Ordinary Differential Equations.
Sneddon, Elements of Partial Differential Equations.
References: Churchill, Modern Operational Mathematics in Engineering.
Piaggio, Differential Equations.
Smith, Mathematical Methods for Scientists and Engineers.
Prerequisites: Mathematics 305* and 306* or 307* and 308*.

Mathematics 405*, Functions of a Complex Variable

General properties of analytic functions. (Half course).
Text: Franklin, Functions of Complex Variables.
Prerequisite: Mathematics 300.

Mathematics 406*, Special Functions

Continuation of Mathematics 405*. (Half course).
Text: To be announced.
Prerequisite: Mathematics 405*.

Mathematics 407*, Functions of a Real Variable

Lebesgue measure; Lebesgue and Lebesgue-Stieltjes integrals for functions of one or two variables. (Half course).
Text: To be announced.
Prerequisite: Mathematics 300.

Mathematics 408*, Partial Differential Equations

Elementary theory of distributions, theory of second order linear differential operators, fundamental solutions, eigen function expansions, spectral representations, solution of boundary value problems. (Half course).
Text: To be announced.
Prerequisite: Mathematics 300, 307*, 308*.

Mathematics 410, Modern Algebra II

Groups, rings, fields. Galois theory.
References: Van der Waerden, Modern Algebra.
McCoy: Rings and Ideals.
Prerequisite: Mathematics 310.

Mathematics 425, Differential Geometry

Theory of curves and surfaces. (Half course).
Text: Struik, Introduction to Classical Differential Geometry.
Prerequisite: Permission of the Department.

Mathematics 427, Modern Geometry II

Ordered geometry, absolute geometry, hyperbolic geometry, consistency of various geometries, models. (Half course).
Prerequisite: Honours students, Mathematics 310.
Text: To be announced.

Mathematics 431, Introduction to Mathematical Logic

Symbolic logic, set theory, abstract algebra, prepositional calculus, the predicate calculus, completeness.
Text: To be announced:

Mathematics 433, Set Theory and Topology

Transfinite cardinals and ordinals, abstract spaces, continuous mappings, separable spaces, compact spaces, dimension, simplexes and complexes.
Text: To be announced.
Prerequisite: Open only to honours Mathematics students.

Mathematics 445*, Applied Mathematics II

Advanced classical mechanics. Rigid dynamics in three dimensions; Lagrange's equations: small oscillations: variational principles.
References: Goldstein: Classical Mechanics.
Lanczos: Variational Principles of Mechanics.
Prerequisite: Mathematics 341.

Mathematics 446*, Applied Mathematics III

Introduction to continuum mcehanics. Vector and tensor methods: Introductions to hydrodynamics, elasticity and potential theory.
References: Wilson: Hydrodynamics.
Kaufmann: Fluid Mechanics.
Jeffries: Cartesian Tensors.
Prerequisites: Mathematics 341, 305* or 307*.

Mathematics 447*, Tensor Analysis and Relativity Theory

Development of tensor analysis, application to Riemannian spaces and relativity theory.
Texts: I. S. Sokolnikoff: Tensor Analysis.
E. R. Schrodinger: Space Time Structure.

Mathematics 450, Statistical Theory II

Multi-variate, regression, variance and covariance analysis.
Text: To be announced.
Prerequisite: Mathematics 350.

Mathematics 490, Directed Special Studies

Advanced problems and readings from various mathematical fields. A report or thesis on a specific aspect of mathematics may be required. An examination is set, covering the whole course.
Prerequisite: Open only to honours Mathematics students.

Mathematics 495*, Directed Special Studies

Advanced problems and readings from various mathematical fields. A report or thesis on a specific aspect of mathematics may be required. An examination is set, covering the course. (Half course).
Prerequisite: Open only to honours Mathematics students.

Graduate Studies
The Mathematics Department is prepared to direct graduate students in certain branches of Mathematics.
     A selection from the following courses will be offered if there is sufficient demand:

Mathematics 500, Functional Analysis I

Mathematics 502, Functional Analysis II

Mathematics 504, Integral Equations

Mathematics 510, General Algebra

Mathematics 511, Theory of Groups

Mathematics 512, Group Representations and Applications

Mathematics 513, Theory of Rings

Mathematics 514, Algebraic Number Theory

Mathematics 531, Mathematical Logic

Completeness theorem of the predicate calculus: predicate calculus with equality; application to Algebra; decision problem, complete theories. Some recent research papers will be studied.

Mathematics 533, General Topology

Mathematics 541, Hydrodynamics and Elasticity

Fundamental theory of fluid motion, elasticity theory, wave propagation, selected topics from modern developments in continuum mechanics.

Mathematics 542, Electromagnetic theory and Magneto-hydrodynamics

Electromagnetic theory leading up to Maxwell's equations. Cartesian Tensors. The space-time continuum; the tensor formulation of Maxwell's equations and the Lorentz transformation. Propagation of electromagnetic waves through isotropic and aniso-tropic media. Propagation through ionised gases and the magneto-ionic theory: critical (plasma) frequency: Martyn's theorem. An introduction to Magneto-hydro-dynamics. Boundary value problems, Green's functions, and diffraction theory.
Texts: Abraham and Becker: Classical Electricity and Magnetism.
Jones: The Theory of Electromagnetism.
Jackson, Classical Electrodynamics.
References: Stratton: Electromagnetic theory.
Cowling: Magneto-hydrodynamics.
Prerequisite: Mathematics 305*-306* or the equivalent.

Mathematics 544, Advanced Problems and Readings

In this course time will be devoted to the study of the special functions and methods often needed for the solution of problems at the research level. Research papers will also be studied. The intention is to give the student insight into the sort of attack needed for the problems at this level.

Mathematics 550, Advanced Statistical Theory

Mathematics 551, Advanced Probability Theory

Mathematics 590, Directed Studies—Graduate

Mathematics 598, Master's Thesis (1 course)

Mathematics 599, Master's Thesis

Mathematics 699, Doctorate Thesis

Philosophy

Professor; Chairman of the Department	J. C. S. Wernham
Professor	Bernard Wand
Associate Professor	R. S. Talmage
Assistant Professors	John M. Hems, Andrew Jeffrey
	James M. Thompson (on leave of absence, 1965-66)
Lecturer	Daniel Goldstick, John W. Leyden
Sessional Lecturers	Julian Wolfe, Bela Egyed

Major in Philosophy

Majors in Philosophy will take a minimum of six courses in Philosophy. Special arrangements will be made for students proposing a combined major program. All majors will arrange their programs in consultation with the Department.

A student may not major in Philosophy unless he obtains 'C' standing in the introductory course.

Honours Courses

The honours program may be entered at the beginning of the First year, or by transfer from the pass course (see p. 30). Philosophy 100 should be taken in the First year.

The honours program will consist of a minimum of eight courses in Philosophy, plus an honours tutorial which will count as one course. The student's program for the Second year and subsequent years will be planned in consultation with the chairman of the Department. The following courses will be required: 100; 205; 210; 215; 220; 230; 305; 490.

With permission of the Department a final year honours student may take either or both of Philosophy 520 and Philosophy 525.

Combined Honours

Students who are interested in pursuing an honours program in which Philosophy is combined with another subject are invited to discuss the matter with the chairman of the Department of Philosophy. The minimum requirement in Philosophy in this type of program will be six courses plus the honours tutorial which will count as one course. The following courses will be required: 100; 205; 215; 490; either 210 or 310; either 220 or 230.

Graduate Studies

The Department of Philosophy offers studies leading to the degree of Master of Arts. For admission to the degree program a student must have an honours degree in Philosophy with at least second class standing, or the equivalent of this. A student who does not already have this requirement will be expected first to complete a qualifying year.

A candidate for the M.A. in Philosophy will (1) take four whole courses or the equivalent (or three, in case his thesis is counted as the equivalent of two courses), (2) present a thesis and (3) defend his thesis at an oral examination. One, but not more than one, of the courses taken may be an undergraduate course in Philosophy, or (with permission) a graduate or undergraduate course in a related field. Where an undergraduate course is taken the completion of additional assignments may be required. The thesis will normally be counted as the equivalent of one course. Grades of B or better must be obtained in all courses taken, on the thesis and in the oral examination on the thesis.

A student who works for the M.A. in Philosophy on a part-time basis may be required to pass, with a grade of B or better, a comprehensive examination in Philosophy. Other candidates will not be expected to write a comprehensive examination.

Philosophy 100, Introduction to Philosophy

An introduction to the various areas of Philosophy. The course will consist of lectures on logic, language, and scientific method; and on selected topics in ethics and theory of knowledge.
Day Division: Annually (lectures three hours a week).
Evening Division: 1965-66 (lectures two hours and four hours in alternate weeks).
Members of the Department
Summer, 1965 (lectures five hours a week).
J. Wolfe

Philosophy 205, Greek Philosophy

An examination of early speculation in Greece; of the roles of the Sophists and of Socrates; together with a study of selected topics in the works of Plato and Aristotle.
Prerequisite: Philosophy 100.
Day Division: Annually (lectures and discussion three hours a week).
A. Jeffrey

Philosophy 210, Ethics

A historical and critical analysis of the chief concepts used to explain and justify moral thinking and conduct. The theoretical accounts of the concepts of 'right', 'duty' and 'good', as they are found in writings of modern and contemporary philosophers, are considered. An analysis of the nature of egoism, sympathy and altruism is given in an attempt to determine the possibility of disinterested actions. Finally, the relationship between morality and certain political, religious, and scientific beliefs is examined.
Prerequisite: Philosophy 100.
Day Division: Annually (lectures and discussion three hours a week).
B. Wand

Philosophy 215, Modern Philosophy: 1600-1800

An examination of the major philosophical writers of the seventeenth and eighteenth centuries. Selections will be studied from the works of Descartes, Spinoza, Leibniz; Locke, Berkeley, Hume; and Kant.
Prerequisite: Philosophy 100.
Day Division: Annually (lectures and discussion three hours a week).
J. C. S. Wernham

Philosophy 220, Philosophical Analysis

A brief account of the history of the movement will be followed by careful study of representative samples of analytic philosophy. Thereafter, analytic techniques will be applied to a variety of problems including those of meaning and truth, knowledge, memory, time and space, and the possibility of metaphysics; and an attempt will be made to determine the scope and usefulness of these techniques.
Prerequisite: Philosophy 100.
Day Division: Annually (lectures and discussion three hours a week).
D. Goldstick

Philosophy 230, Logic and Scientific Method

A study of truth-functional and quantificational logic will be made, together with an elementary discussion of the nature and properties of formalized systems. This will be followed by an examination of the nature and methods of the empirical sciences, special attention being paid to the role, development and structure of scientific theories and to the nature of scientific explanation.

Prerequisite: Philosophy 100.

Day Division: Annually (lectures and discussion three hours a week).

J. W. Leyden

Summer, 1965 (lectures five hours a week).

B. Egyed

Philosophy 240, Aesthetics

Analysis of problems in the description, interpretation and evaluation of works of art, including music, literature and the visual arts; together with the study of types of aesthetic theory.

Prerequisite: Philosophy 100.

Day Division: Not offered, 1965-66.

Philosophy 250, Philosophy of Mind

An attempt to answer some of the principal questions of the philosophy of mind. Among the topics to be considered will be belief and thinking, pain and pleasure, imagination, intention, emotion, personal identity, the relations between mind and body, the unconscious, mental illness, telepathy and clairvoyance, and our knowledge of other minds.

Text: Ryle; The Concept of Mind.

Prerequisite: Philosophy 100.

Day Division: Annually (lectures and discussion two hours a week).

R. S. Talmage

Philosophy 300, Philosophy and Religion

An investigation, both historical and systematic, into the relations between faith and reason; together with an examination of the question of the existence and nature of God. Texts to be studied will be representative of mediaeval Scholasticism, German Idealism, Existentialism, and Philosophical Analysis.

Prerequisite: Philosophy 100 or permission of the Department.

Day Division: Annually (seminar two hours a week).

J. C. S. Wernham

Philosophy 305, Modern Philosophy: 1800-

An examination of the major philosophical writers of the nineteenth and twentieth centuries; German Idealism from Kant to Hegel; the anti-Hegelian philosophies of Marx, Kierkegaard, Schopenhauer and Nietzsche; evolution and the philosophy of Bergson; American Pragmatism (James, Peirce, Dewey); Whitehead; a brief sketch of recent philosophy.

Prerequisite: Philosophy 100.

Day Division: Annually (lectures and discussion three hours a week).

J. M. Hems

Philosophy 330 [310], Social and Political Philosophy

An examination of the concepts of society, state, natural law, inalienable rights and social justice; and a consideration of the moral basis of political obligation. Emphasis will be on analysis rather than on historical origins.
Prerequisite: Philosophy 100 or permission of the Department.
Day Division: Annually (seminar two hours a week).
B. Wand

Philosophy 490, Philosophy Honours Tutorial

A. Jeffrey

Graduate Courses

Philosophy 516*, Descartes (Half Course)

An intensive study of selected texts.
Day Division: Annually (two hours a week, first term).
J. C. S. Wernham

Philosophy 517*, Hume (Half Course)

An intensive study of selected texts.
Day Division: Annually (two hours a week, second term).
B. Wand

Philosophy 520, Current Problems

A number of recent books and papers on connected themes will be discussed.
Day Division: Annually (seminar two hours a week).
D. Goldstick and R. S. Talmage

Philosophy 525, Kant

An intensive study of some part of Kant's philosophy.
Day Division: Annually (seminar two hours a week).
J. M. Hems and J. W. Leyden

Philosophy 598, Master's Thesis (equivalent of one course)

Philosophy 599, Master's Thesis (equivalent of two courses)

Physics

Professor; Chairman of the Department	E. P. Hincks
Professor	M. K. Sundaresan
Associate Professors	A. L. Carter, T. J. S. Cole, A. C. Ghosh, G. R. Love,
Assistant Professors	J. E. Hardy, B. J. Spenceley
Sessional Lecturer	J. P. Jan
Senior Demonstrators	E. Butterill, R. Ruedy, P. W. Sargeant
Demonstrators	B. Gaizauskas, G. Sangster
Senior Technician	K. Hafner
Teaching Fellows	D. A. Klingspon, L. S. Wright

Students taking a single course in physics should take Physics 10 or 100. Students taking more than one course in physics should take Physics 100. A minor in physics consists of Physics 100, 210 (202) and 230 (201).

Prerequisites are strictly enforced and Prerequisite courses may not be taken *concurrently* unless so indicated.

Major in Physics
Typical Pattern (Minimal Departmental Requirements)

Year I
Physics 100
Chemistry 100
Mathematics 100
Biology 100 or Geology 100
One of: Classical Civilization 200 or 201
       English 100
       Philosophy 100

Year II
Physics 210 (202)
Physics 230 (201)
Mathematics 200
Mathematics 210
One Humanity

Year III
Physics 300 (340)
Physics 309 (345)
Physics 321* (315*)
Physics 341* (310*)
Physics 360 (330)
Mathematics 307* and 308*
One Humanity

Honours Course
Typical Pattern (Minimal Departmental Requirements)

Year I
As for Physics Major Course

Year II
As for Physics Major Course

186

Year III
Physics 300 (340)
Physics 309 (345)
Physics 317* (370*)
Physics 321* (315*)
Physics 338* (325*)
Physics 341* (310*)
Physics 360 (330)
Mathematics 307* and 308*
One Humanity

Year IV
Physics 400 (440)
Physics 437* (425*)
Physics 447* (410*)
Physics 458* (418*)
Physics 468* (430*)
Physics 476 (470)
Physics 499 (460-1)

During the vacation between Year III and Year IV, students are required to famil-
iarize themselves with a specialized topic; they will deliver a fifty minute dissertation
upon that subject during the first term of the Year IV. Comprehensive examinations
are given in physics and related mathematics and the student must submit a thesis
on his work carried out in Physics 499 (460-1). The fulfilment of the requirements
stated in this paragraph is the responsibility of the student.

Combined Honours Course in Mathematics and Physics
Typical Pattern (Minimum Departmental Requirements)

Year I
Physics 100
Chemistry 100
Mathematics 100
Biology 100 or Geology 100
One of: Classical Civilization 200 or 201
        English 100
        Philosophy 100

Year II
Physics 210 (202)
Physics 230 (201)
Mathematics 200
Mathematics 210
One Humanity
One Humanity (Winter or Summer Course)

Year III
Physics 307* (341*)
Physics 317* (370*)
Physics 341* (310*)
Physics 360 (330)
Mathematics 300
Mathematics 307* and 308*
Mathematics 310
Mathematics 341

Year IV
Physics 407* (441*)
Physics 437* (425*)
Physics 447* (410*)
Physics 476 (470)
Mathematics 403
Physics 499 (461) or Mathematics 490
One Mathematics or Physics Course

Candidates for Combined Honours degrees must show a reading knowledge of French, German or Russian.

During the vacation between Year II and Year III, students will be required to undertake directed reading. During Year IV comprehensive examinations (or special projects) are given in physics and mathematics.

Other Students

Students taking a course or courses numbered higher than 299 are required to take Physics 307* (341*) or 407* (441*) concurrently. Engineering students may, with the permission of the School of Engineering and the Physics Department, take the lecture course Physics 360 (330) without the accompanying laboratory course Physics 307* (341*).

Graduate Studies

Candidates for the Doctor's and Master's degrees are accepted for full-time work in the physics research laboratories under the supervision of members of the Department. The requirements and general regulations of the Faculty of Graduate Studies are applicable. A Master's degree may be obtained on a part-time basis. Full regulations for graduate study are available separately.

Language

Candidates for the degree of Bachelor of Science in Physics must show a reading knowledge of French, German or Russian. An examination to satisfy this requirement may be written during any regularly scheduled examination period only. Requests for examination should be submitted to the Chairman of the Department by February 15th; application for examination is the responsibility of the student. Graduate students are required to satisfy a prescription specified by their Supervisor in consultation with the Department.

Summer School Offerings

The following courses, Physics 100 and Physics 317* (370*) will be offered in the 1965 Summer School program (Evening Division).

Physics 10, Pre-University Physics

Prerequisites: Mathematics 15*, 25*, and 35* (may be taken concurrently).
Day Division: Annually (lectures two hours per week, laboratory demonstrations and problems two hours per week).
D. A. Klingspon and L. S. Wright

Physics 100, Introductory Physics

This course introduces mechanics, the properties of matter, electricity and magnetism, wave motion, optics, acoustics and some modern topics. A balance is maintained between depth and range.
Text: To be announced.
Prerequisites: Physics 10; Mathematics 100 (may be taken concurrently).
Day Division: Annually (lectures three hours per week, laboratory three hours per week).
A. L. Carter

Physics 210 (202), General Physics

Classical mechanics of a particle and of a rigid body using vector notation. Classical properties of matter. Wave motion and acoustics. Heat, thermodynamics, and kinetic theory. Some wave properties of light.
Text: Sears, F. W., Mechanics, Wave Motion, and Heat.
Prerequisites: Physics 100; Mathematics 100; Mathematics 200 (may be taken concurrently).
Day Division: Annually (lectures three hours per week, laboratory three hours per week).
T. J. S. Cole and P. W. Sargeant

Physics 230 (201), Electricity and Magnetism

The theory of electric and magnetic fields is covered in some detail as is electro-magnetism and electromagnetic induction. D.C. and A.C. circuit theory is presented and the principles of complex numbers and complex circuit theory are discussed briefly. An introduction to vacuum tube circuits is provided for Science students while Engineering students are introduced to conduction in gases and solids, the junction diode and junction transistor. The laboratory deals primarily with electrical measurements.
Texts: Kipp, Electricity and Magnetism.
Laboratory Instructions for Physics 230 (201).
Reference: Sears and Zemansky, University Physics.
Prerequisites: Physics 100; Mathematics 100; Mathematics 200 (may be taken concurrently).
Day Division: Annually (lectures three hours per week, laboratory three hours per week).
G. R. Love and R. Ruedy
Evening Division: 1965-66 (lectures three hours per week, laboratory three hours per week).

Physics 300 (340), Third Year Laboratory

Text: Baird, Experimentation.
Reference: Malmstadt, Enke and Toren, Electronics for Scientists.
Day Division: Annually (laboratory six hours per week).
B. J. Spenceley

Physics 307* (341*), Selected Experiments from Physics 300 (340)

Text: Baird, Experimentation.
Day Division: Annually (laboratory three hours per week).
B. J. Spenceley

Physics 309 (345), Laboratory Technique

During this course the student learns basic technical operations used in the design and construction of research apparatus. *This is a non-credit course.*
Prerequisites: Physics 210 (202) and 230 (201); Mathematics 200.
Day Division: Annually (workshop three hours per week).
K. Hafner

Physics 317* (370*), Mathematical Physics I

Classical dynamics: linear motion of a particle, energy integral, conservation of energy; oscillatory motion, free and forced; damping, Q value, forced motion under external forces; motion in two and three dimensions; conservation laws. Motion of rigid bodies in a plane. Coupled systems and normal coordinates. An elementary discussion of principles of fluid mechanics. Study of wave equation and its solution for vibrating string and membrane. Equation of heat conduction. Fourier analysis as applied to these problems.
Text: Becker, Introduction to Theoretical Mechanics.
Prerequisites: Physics 210 (202) and 230 (201); Mathematics 200.
Day Division: Annually, all year (lectures one and a half hours per week).
J. E. Hardy

Physics 321* (315*), Optics

Interference and diffraction phenomena with polarized and unpolarized light are studied starting from Huygen's principle. Applications to interferometry are discussed.
Text: To be announced.
Prerequisites: Physics 210 (202) and 230 (201); Mathematics 200.
Day Division: Annually, first term (lectures three hours per week).
B. J. Spenceley

Physics 338* (325*), Electromagnetism

The experimental laws of electricity and magnetism are reformulated in the notation of the vector calculus as Maxwell's equations. Formal solutions of potential problems are discussed. Some mention is made of the properties of dielectric and magnetic materials.
Text: Corson and Lorrain, Introduction to Electromagnetic Fields and Waves.
Prerequisites: Physics 210 (202) and 230 (201); Mathematics 200.
Day Division: Annually, second term (lectures three hours per week).
T. J. S. Cole

Physics 341* (310*), Thermodynamics

The method of thermodynamics and the first and second laws are discussed exhaustively. Applications of the laws are discussed in fair detail. The course includes the theory of specific heats and an introduction to the theory of transport phenomena.
Text: Fermi, Thermodynamics.
Prerequisites: Physics 210 (202) and 230 (201); Mathematics 200.
Day Division: Annually, first term (lectures three hours per week).
A. C. Ghosh

Physics 360 (330), Atomic Physics

The course is designed to provide a logical transition from classical to modern physics. The determination of the specific charge of ions, Rutherford and Compton scattering, optical and x-ray spectroscopy are examined. Some discussion is given of special relativity and the Schrödinger equation with an introduction to molecular spectra, solid state physics and nuclear physics.
Text: To be announced.
Prerequisites: Physics 210 (202) and 230 (201); (or Engineering 211, 220 and 240); Mathematics 200.
Day Division: Annually (lectures three hours per week).
A. C. Ghosh

Physics 400 (440), Fourth Year Laboratory

Prerequisite: Physics 300 (340).
Day Division: Annually (laboratory four hours per week).
B. J. Spenceley

Physics 407* (441*), Selected Experiments from Physics 400 (440)

Prerequisite: Physics 300 (340) or 307* (341*).
Day Division: Annually (laboratory three hours per week).
B. J. Spenceley

Physics 437* (425*), Electromagnetic Radiation

Electromagnetic wave propagation in a vacuum, dielectric, conductor, good conductor, and ionized gas. Reflection, refraction, polarization at the plane boundary between two media. Waveguide and transmission line propagation. Dipole and quadrupole radiation fields. Antenna systems.
Text: Corson and Lorrain, Electromagnetic Fields and Waves.
Reference: Panofsky and Philips, Classical Electricity and Magnetism.
Prerequisite: Physics 338* (325*) (except for Combined Honours students).
Day Division: Annually, first term (lectures three hours per week).
T. J. S. Cole

Physics 447* (410*), Statistical Physics

The course begins with a brief discussion of the application of statistics to physical measurements. This is followed by an elementary study of classical and quantum statistical mechanics. Maxwell-Boltzman, Bose-Einstein, and Fermi-Dirac statistics are derived, and applied in appropriate physical situations. The relation between thermodynamics and statistical mechanics is considered. Kinetic and transport theories are discussed.
References: R. B. Lindsay, Physical Statistics.
Whittaker and Watson, The Calculus of Observations.
K. Huang, Statistical Mechanics.
Prerequisite: Physics 341* (310*).
Day Division: Annually, first term (lectures three hours per week).
J. E. Hardy

Physics 458* (418*), Electron Physics

The course contains a detailed description of the electrical and mechanical properties of matter.
Text: To be announced.
Prerequisite: Physics 447* (410*).
Day Division: Annually, second term (lectures three hours a week).

Physics 468* (430*), Nuclear Physics

The course starts where Physics 360 (330) left off; basic facts about nuclei and nuclear forces are discussed in further detail. The passage of charged particles and radiation through matter is described. A detailed study of the alpha and beta instability of nuclei is followed by a discussion of nuclear excited states, gamma emission and internal conversation. Nuclear models are introduced with particular emphasis on the shell model. After a discussion of nuclear reactions, the course is rounded off with a review of particle physics.
Text: Halliday, Introductory Nuclear Physics.
Prerequisite: Physics 360 (330).
Day Division: Annually, second term (lectures three hours per week).
A. C. Ghosh

Physics 476 (470), Mathematical Physics II

Classical dynamics: Lagrange's and Hamilton's equations and their application to some problems in dynamics. Hamilton's principle. Euler angles, spinning top.
Quantum mechanics: Schrödinger and Heisenberg methods are studied in some detail and applied to problems in one and three dimensions. Elements of perturbation theory and simple applications. Elements of scattering theory. Dirac's theory of the electron and its non-relativistic approximation.
Special relativity: Lorentz transformations. Invariance of Maxwell's equations under Lorentz transformations.
Prerequisite: Physics 317* (370*).
Day Division: Annually (lectures three hours per week).
M. K. Sundaresan

192

Physics 499 (460-1), Fourth Year Project

These are advanced projects of an experimental or theoretical nature with an orientation towards research. The presentation of a thesis is required; *the fulfilment of this requirement is the responsibility of the student.*
Prerequisite: Admission to Year IV.
Day Division: Annually (a minimum of six hours laboratory or private study per week).
Members of the Department

Physics 511* (514*), Classical Mechanics and Theory of Fields

Hamilton's principle. Conservation laws. Canonical transformations. Hamilton-Jacobi theory. Langrangian formulation of classical field theory.
Day Division: Annually, first term (two 1½-hour seminars per week).
M. K. Sundaresan

Physics 532* (515*), Classical Electrodynamics

Covariant formulation of electrodynamics. Lenard-Wiechert potentials. Radiation reaction. Hamiltonian formulation of electrodynamics.
Day Division: Annually, second term (two 1½-hour seminars per week).
M. K. Sundaresan

Physics 540 (511), Statistical Mechanics

The fundamental principles of statistical mechanics. The emphasis is on general theory rather than on particular applications.
Text: Hill, Statistical Mechanics.
Prerequisites: Physics 511* (514*), 532* (515*), 570 (516).
Not offered, 1965-66.

Physics 560, Physics of Elementary Particles

A complete survey of the properties of the elementary particles from a phenomenological viewpoint. Classification of the particles and of the forces between them. Conservation laws and invariance principles. The interactions of high energy particles with matter. Acceleration and detection techniques. Discussion of selected experiments of current interest.
Day Division: Annually (seminars three hours per week).
E. P. Hincks

Physics 570 (516), Intermediate Quantum Mechanics with Applications

After a review of the basic postulates of quantum mechanics, the rotation group and its representations are studied in some detail. Addition of angular momenta is studied up to recoupling schemes and Racah coefficients. Applications are considered in nuclear, atomic and molecular structure. After a review of various approximation techniques—perturbation theory, W.K.B. method, variational methods—elementary scattering theory is applied to elastic, inelastic, and rearrangement processes. Finally, the Dirac electron is studied.
References: M. Tinkham, Group Theory and Quantum Mechanics.
G. L. Trigg, Quantum Mechanics.
M. L. Goldberger and K. M. Watson, Collision Theory.
Prerequisite: Physics 476 (470).
Day Division: Annually (lectures three hours per week).
J. E. Hardy

Physics 580 (507), Solid State Physics

The structure of solids.
Prerequisite: Physics 476 (470).
Day Division: Annually (one two-hour seminar per week).
J. P. Jan

Physics 590 (505), Selected Topics in Physics

During a full course of post-graduate study a student may, with the permission of the Department, take more than one selected topic. In that case each full course in Physics 590 (505) will be counted for credit. Not more than one selected topic may be counted for credit in any one academic year.
Members of the Department

Physics 599 (501-2), Graduate research leading to a Master's degree thesis

Physics 660 (513), Advanced Nuclear Physics

The following topics are studied: nucleon-nucleon interaction with a detailed study of low and high energy scattering experiments; nuclear models with special emphasis on the shell model and the collective model; nuclear reactions; direct interactions; electromagnetic transitions in nuclei and the experimental determination of level parameters; beta decay; the scattering of electrons and the form factors of nuclei and nucleons.
Prerequisites: Physics 468* (430*), 511* (514*), 532* (515*), 570 (516).
Day Division: Annually (one two-hour seminar per week).

Physics 670 (508), Advanced Quantum Mechanics

An introduction to quantum field theory. The course begins with a discussion of the Poincaré group and its representations. This is followed by an introduction to second quantization, applied in particular to the Dirac and electromagnetic fields. Then the formal theory of scattering (S-matrix theory) is reviewed and applied to simple models. After an introduction to quantum electrodynamics, the course will move on to specialized topics (negotiable).
Text: S. Schweber, An Introduction to Relativistic Quantum Field Theory.
Prerequisites: Physics 511* (514*), 532* (515*), 570 (516).
Day Division: Annually (lectures three hours per week).

Physics 699 (503-4), Graduate research leading to a Doctor's degree thesis

Political Science

Professor; Chairman of the Department	Douglas G. Anglin
Professors	R. O. MacFarlane, K. D. McRae (on leave of absence, 1965-66), Donald C. Rowat
Associate Professors	Adam Bromke, Pauline Jewett (on leave of absence, 1965-66), K. Z. Paltiel, A. M. Willms
Assistant Professors	Robert J. Jackson, K. E. Kitchen (on leave of absence, 1965-66), Robert R. March, Harald von Riekhoff, George Roseme, Paul L. Rosen, G. F. Schaefer, Michael Stein
Visiting Professors	Alexander Brady, R. A. MacKay, F. H. Underhill
Sessional Lecturers	J. Duncan Edmonds, Eugene A. Forsey, Allan Gotlieb
Research Fellow in Defence Studies	M. E. Sherman

Ottawa provides a wealth of resources, both in personnel and in research materials, for the student of government, politics, public administration, and international relations. Undergraduates will be assisted in making the fullest use of these unique advantages of the national capital.

Major Program (3 Years)

A major in Political Science requires six or more courses (and a combined major including Political Science, four or more courses) in the Department, including Political Science, 101, 230 and at least one of 210, 220 and 260. Majors are advised to take Mathematics 101 as their First year mathematics or science option and should take a number of courses in related Social Sciences. Final-year majors with the required standing may, with permission, be admitted to Fourth year honours courses. The entire program must be approved by the Department.

A major must obtain at least "C" in Political Science 100 to enter Second year and must maintain an overall average of at least "C" in his Political Science courses to continue into Third year. For special supplemental examinations to raise grades, see page 32.

Honours Programs (4 Years)

The honours programs may be entered in the First year from First year Honours in the Social Sciences (see p. 37), or by transfer from pass programs if sufficient standing has been obtained. Honours students will be assigned individual tutors to advise them on their studies. The following programs are available:

Political Science

For full honours, nine courses in Political Science will be required, including Political Science 101, 231, 261, 498 and either 400, 405 or 510. Candidates present a graduation essay on some topic involving independent investigation; they are examined orally on this essay and must receive for it a grade of at least B—. They must select a minor field or fields, preferably in Economics, History, Philosophy or Sociology, and by the final year must show a reading knowledge, sufficient for research, of a language other than English, preferably French, German, or Russian. They are advised to take Mathematics 101 as their First year mathematics or science option and Political Science 270 or a course in statistics or social research (Economics 220, Psychology 205, Mathematics 255-256, or Sociology 200).

Combined Honours

Students intending to enter a program combining Political Science with another discipline should in their First year take Political Science 101 and the introductory

course in the other discipline. The choice of courses in subsequent years will be subject to the approval of the two departments. Combined honours require at least six courses in Political Science, including Political Science 101, 231 and either 400, 405 or 510. Students must meet the same Fourth-year requirements in each department as for single honours, except that the graduation essay may be written for either department and preferably should make use of both disciplines. For combined honours with Philosophy the student must take both Philosophy 490 and Political Science 498.

At present, students may take combined honours in Political Science and either Economics, Geography, History, Philosophy or Sociology. Combinations with other subjects will also be considered. All combined honours programs will be arranged so that the student may transfer to full honours in either discipline at the end of the Third year, if he then wishes to specialize more intensively.

Graduate Programs

The Department offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. Facilities for specialized graduate study and research are currently available in the following fields:

Political Theory: historical and analytical.

Political Institutions: comparative government—American, European, Soviet, Commonwealth, and African; federalism; political parties, political process, and political sociology.

Canadian Government: Federal; provincial and local; constitutional law.

Public Administration: Canadian and comparative; administrative law.

International Relations: analytical, diplomatic, and institutional; international law; foreign relations of Canada, and of the Communist and African states.

For the Graduate Diploma in Public Administration and the Master of Arts in Public Administration, see pp. 48 and 49.

Master of Arts Program (full-time or part-time)

Admission. Students with an honours degree or the equivalent in Political Science may complete the requirements for the M.A. in one academic year. Honour graduates in fields other than Political Science will be considered on the basis of their course of study and standing. Those with deficiencies may have to take additional courses. Graduates having a pass major in Political Science with high standing may be admitted, but will ordinarily be required to complete a qualifying year. For further details, consult the Chairman of the Department. Students entering the M.A. program with a view to proceeding to the Ph.D. should inform the Department in order that their M.A. program may be planned accordingly.

Degree Requirements:

1. Three approved graduate courses in Political Science. One or, in exceptional cases, two of these may be at the 400 level.

2. An oral comprehensive examination on approved major and minor fields chosen from the following list: political theory, Canadian government, comparative government, political behaviour and the political process, public administration, international relations. Students may also minor in: public law, provincial and local government (unless the major is Canadian government), Soviet or African studies, an approved field in a related discipline. The thesis will normally be in the major field.

3. A substantial thesis involving original research in an approved field of study (equivalent to two courses).

4. A reading knowledge, sufficient for research, of an appropriate language other than English, preferably French.

Candidates will be assigned a tutor who will advise them on the thesis and on preparation for the comprehensive and language examinations.

Doctor of Philosophy Program (full-time only)
This program is designed to give selected students a professional qualification in Political Science.

Admission. Applications will be considered from outstanding students holding the Master of Arts degree or its equivalent in Political Science, Public Administration or, in special cases, a related discipline. Such candidates may be required to take qualifying courses to remedy deficiencies in their background. Other applicants will be expected to take the Master's degree first. All students will be expected to have or acquire an adequate basic knowledge of political theory and Canadian government regardless of their fields of concentration, and an acquaintance with disciplines closely related to Political Science. They will also be expected to have had, or to take, a course in statistics if a knowledge of this subject is needed for preparation of the thesis. A qualifying examination may be set in one or more fields in order to determine eligibility of admission.

Degree requirements: These will entail at least two years of full-time study beyond the Master's degree. The comprehensive examination will normally be taken during the second year.
1. At least three graduate courses, and directed study in accordance with individual needs.
2. A written and oral comprehensive examination in three approved fields of concentration chosen from the following list.
(1) *Political Theory*: A general knowledge of political theory with emphasis on one of the following topics: (a) ancient and medieval political thought; (b) the history of political thought from Machiavelli to the present; (c) nineteenth and twentieth century political thought, including recent developments in political analysis.
(2) *Political Institutions*: A general knowledge of the theory and practice of political institutions with emphasis on one or more of the following topics: (a) political parties and the political process; (b) federalism and/or local government; c) comparative government in general or with reference to an approved combination of countries; (d) Canadian Government and Politics.
(3) *International Relations*: A general knowledge of the subject with particular emphasis on one or more of the following topics: (a) analytical theory; (b) foreign policies of particular states; (c) international institutions and law.
(4) *Public Administration*: A general knowledge with emphasis on at least two of the following topics: (a) theories; (b) Canada; (c) comparative, with reference to an approved combination of countries; (d) administrative law.
(5) *The Politics of a Particular Country or Area*: An intensive study of the political institutions, political ideas, and international relations of a single country or area. Students will be expected to be acquainted with the relevant historical, social, and economic aspects of their subject. For the present, approved areas of study are: (a) Britain; (b) The United States; (c) the Soviet bloc, or part of it; (d) Africa, or part of it.
(6) An approved field in a related discipline may be substituted for (5) above.
Candidates will be expected to pass their comprehensive examination before embarking on the thesis.
3. A thesis written in English or French, and defended orally in English. The oral examination may include matters related to the general field of the thesis. Although Ottawa is rich in research facilities in some fields, students may pursue their investigations elsewhere when this is advantageous.

198

4. Language requirements: The ability to read and translate French easily and to converse in French with moderate fluency. This requirement must be met before the comprehensive examination. The oral part of the requirement may be met by successful completion of French 201. Candidates from outside Canada may be permitted to offer a reading knowledge of another main language in place of French. Normally, candidates must also be able to read a third language appropriate to their program. This requirement should be met before the comprehensive examination and must be met before the presentation of the thesis.

A supervisor will be assigned to each student to advise him on his program. The whole program must be approved by the Chairman of the Department in the light of the student's needs and interests, and the Department's resources.

Political Science 10, Government and Society

An introduction for students from developing countries to the concepts, institutions and problems of democratic government.
Not offered, 1965-66.

First Year

Political Science 100, Introduction to Political Science

Modern political ideas and institutions, with particular attention to Canada, Britain, and the United States.
Texts: Corry and Hodgetts, Democratic Government and Politics.
Lipson, The Great Issues of Politics (3rd ed.).
Day Division: lectures and discussion three hours a week.
R. Jackson
Evening Division: lectures and discussion three hours a week.
M. Stein
Summer Session, Day: lectures and discussion ten hours a week.
K. E. Kitchen
Summer Session, Evening: lectures and discussion five hours a week.
K. E. Kitchen and G. F. Schaefer

Political Science 101, Introduction to Political Science

An introductory course for first-year honours students in any discipline and for potential majors in Political Science.
Day Division: lectures and discussion three hours a week.
K. Z. Paltiel

Second Year: Majors and Honours

Political Science 210 Government and Politics in Western Europe

Britain, France, Western Germany, and other European democracies.
Prerequisite: Political Science 100.
Day Division: lectures and discussion three hours a week.
R. Jackson and G. F. Schaefer

Political Science 220, Government and Politics in the United States

American political thought, constitutional development, and the governmental process.
Prerequisite: Political Science 100 or 101.
Evening Division: lectures and discussion three hours a week.
G. Roseme
Summer Session, Day: lectures and discussion ten hours a week.
G. F. Schaefer

Political Science 230, History of Political Thought

The development of Western political theory and related aspects of intellectual history from classical times to the end of the eighteenth century. Readings from Plato, Aristotle, Machiavelli, Bodin, Hobbes, Locke, Rousseau, Burke and others.
Prerequisite: Political Science 100 or 101, or permission of the Department.
Day Division: lectures and discussion three hours a week.
P. L. Rosen
Evening Division: lectures and discussion three hours a week.
G. F. Schaefer.
Summer Session, Evening: lectures and discussion five hours a week.
P. Rosen

Political Science 231, History of Political Thought

Same as Political Science 230, but at a deeper level, for honours and graduate students in any discipline. An analysis of classical philosophy and its modern form.
Prerequisite: Political Science 100 or 101, or permission of the Department.
Day Division: lectures and discussion three hours a week.
P. L. Rosen

Political Science 260, International Politics

An introduction, emphasizing the period from 1939 to the present.
Prerequisite: Political Science 100 or 101, or permission of the Department.
Day Division: lectures and discussion three hours a week.
H. von Riekhoff
Summer Session, Evening: lectures and discussion five hours a week.
A. Bromke

Political Science 261, International Politics

Same as Political Science 260, but at a deeper level, for honours and graduate students in any discipline.
Prerequisite: Political Science 100 or 101, or permission of the Department.
Day Division: lectures and discussion three hours a week.
A. Bromke

Political Science 270, Political Inquiry

This course introduces the student to the elements of systematic political analysis. While it covers all present modes of inquiry in the discipline, survey research methods and their necessary statistical background will be emphasized.
Prerequisite: Political Science 100 or 101.
Day Division: lectures two hours a week; lab. two hours a week.
R. March

Third Year: Majors and Honours

Political Science 300, Canadian Government and Politics

Institutions and the political process at the federal, provincial and municipal levels. This course is for third-year majors in other departments, and for students who have taken an introductory course not based primarily on Canadian government. For the present it is not open to students who have taken Political Science 100.
Prerequisite: Completion of second year.
Evening Division: lectures and discussion three hours a week.
E. A. Forsey

Political Science 310, The Commonwealth in Asia and Africa

The evolution and working of political institutions in the Commonwealth countries of Asia and Africa (and also in South Africa and the West Indies).
Prerequisites: Political Science 100 or 101, and preferably a further course in Political Science.
Day Division: lectures and discussion three hours a week.
D. G. Anglin

Political Science 320, Soviet Government and Politics

Soviet political institutions and the role of the Communist Party. The impact of the Soviet political model on China, Yugoslavia and other communist countries.
Prerequisites: Political Science 100 or 101, and preferably a further course in Political Science or History 260.
Day Division: lectures and discussion three hours a week.
G. Roseme

Political Science 330, Social and Political Philosophy

Offered in the Department of Philosophy as Philosophy 330.

Political Science 335, Political Economy in the Modern State

A study of some basic problems of political and economic organization and public policy, which raise important questions of both economic and political theory. Also offered as Economics 335.
Prerequisites: Economics 100, Political Science 100 or 101, and a further course in either Economics or Political Science.
Day Division: lectures and seminars two hours a week.
H. S. Gordon

Political Science 340, Problems in Public Administration

A comprehensive survey, with concentration on problems at the national level in Canada. The seminar work includes use of the case-study technique as developed at Harvard University.
Texts: Hodgetts and Corbett, Canadian Public Administration.
Rowat, Basic Issues in Public Administration.
Prerequisites: Political Science 100 or 101, and preferably a further course in Political Science.
Day and Evening Divisions: lectures and seminars three hours a week.
A. M. Willms
Summer Session, Evening: lectures and discussion five hours a week.

Political Science 350, Elements of Law

Offered in the Department of Public Law as Public Law 350.

Fourth Year: Honours and Graduate

Third year honours students, and majors with equivalent standing, may with permission of the Department be admitted to these seminars.

Political Science 400, Government of Canada

Student reports on specific topics will be presented and discussed.
Prerequisites: Political Science 100 or 101, and a further course in Political Science.
Day and Evening Division: seminar three hours a week.
R. O. MacFarlane and K. Z. Paltiel
Evening Division: seminar three hours a week.
J. D. Edmonds

Political Science 405, Canadian Federalism

The concept of federalism and its implementation elsewhere; past, present and future federalism in Canada.
Prerequisites: Political Science 100 or 101, and a further course in Political Science.
Day Division: seminar three hours a week.
M. Stein

Political Science 430, Modern Political Thought

The major political ideas of the nineteenth and twentieth centuries.
Prerequisite: Political Science 230, or permission of the Department.
Day Division: seminar three hours a week.
G. Roseme and P. L. Rosen

Political Science 435, Liberty and Authority in Modern Western Societies

A research seminar on problems of reconciling individual freedom with social control, with emphasis on protection of human rights in the constitutions and public policy of the European liberal democracies. Students will be expected to use one West European language.
Not offered, 1965-66.

Political Science 450, Constitutional Law

Offered in the Department of Public Law as Public Law 450.

Political Science 460, International Institutions

Their origins, structure and functioning, with emphasis on the League of Nations, the United Nations, and regional co-operation in Europe and the Atlantic community.
Prerequisite: Political Science 260 or History 380, or permission of the Department.
Day and Evening Divisions: seminar three hours a week,
A. Gotlieb

Political Science 490, Tutorial in a Selected Field

Members of the Department are prepared to give reading courses in the government and politics of the following countries or areas: Britain, Western Germany, the Middle East, or Africa South of the Sahara.
Day Division: hours arranged.

Political Science 498, Honours Graduation Essay

Day Division: tutorial hours arranged.

Graduate Courses

Fourth year honours students may, with permission of the Department, be admitted to these seminars.

Political Science 500, Provincial and Municipal Government

Problems of government and administration, and of inter-governmental relations. Guest experts participate from time to time.
Day and Evening Division: seminar three hours a week.
R. O. MacFarlane and D. C. Rowat

Political Science 505, Comparative Federalism

A comparative analysis of federal systems, including those of the new nations.
Not offered, 1965-66.

Political Science 510, The Political Process in Canada

An analytical and comparative study of the democratic political process, with particular reference to political parties and elections, pressure groups, public opinion, and political leadership in Canada.
Day Division: seminar three hours a week.
R. March

Political Science 520, Nationalism

The general problem of nationalism, its current manifestations, and the attempts to contain and institutionalize its expression. The second part deals with French-Canadian nationalism. A reading knowledge of French is advisable.
Day and Evening Division: seminar three hours a week.
K. Z. Paltiel

Political Science 530, Analytical Political Theory

The role of theory in the study of politics and the major concepts used in political analysis. The possibilities and limitations of the historical, institutional, functional, behavioural, and general systems approaches. Attention will also be paid to problems of research methodology, including hypothesis formation, application of theorems, and conceptual frameworks, and to problems of proof and interpretation.
Day Division: seminar three hours a week.
G. F. Schaefer

Political Science 535, The Canadian and American Political Traditions

Day Division: seminar three hours a week.
F. H. Underhill

Political Science 540, Theory and Practice of Administration

Student reports on specific topics will be presented and discussed. Senior government officials take part in the seminar regularly.
Evening Division: seminar three hours a week.
R. O. MacFarlane

Political Science 545, Comparative Public Administration

The comparative approach to the study of administration; a comparison of public administration under various systems of democratic government, particularly in Europe and the English-speaking world.
Day and Evening Divisions: seminar two hours a week.
D. C. Rowat

Political Science 550, Administrative Law

Offered in the Department of Public Law as Public Law 550.

Political Science 555, International Law

Offered in the Department of Public Law as Public Law 555.

Political Science 560, Canada in World Affairs

Canada's external relations since 1900, with special emphasis on the period since 1939.
Day and Evening Division: seminar three hours a week.
R. A. MacKay

Political Science 565, American Foreign Policy

The foreign policy of the United States in the present century, with special emphasis on trends since the second world war.
Not offered, 1965-66.

Political Science 570, Soviet Foreign Policy

The foreign policy of the Soviet Union since 1917, with special emphasis on trends since the second world war.
Day and Evening Division: seminar two hours a week.
A. Bromke

Political Science 580, Africa in World Affairs

The external relations of African states; Pan-Africanism; African issues at the United Nations; the attitudes of outside powers to Africa.
Not offered, 1965-66.

Political Science 585, Contemporary International Politics

A seminar on selected problems. In 1965-66 the emphasis will be on recent strategic theory.
Day and Evening Division: seminar two and a half hours a week.
R. A. MacKay and H. von Riekhoff

Political Science 590, Tutorial in a Selected Field

Members of the Department are prepared to give reading courses on Africa in World Affairs, Comparative Federalism, or in the government and politics of the following countries or areas: Britain, Western Germany, the Middle East, or Africa South of the Sahara.
Day Division: hours arranged

Political Science 598, Research Essay

For students taking the M.A. in Public Administration who elect to write a research essay rather than a thesis.
Day and Evening Division: tutorial hours arranged.

Political Science 599, M.A. Thesis

Day and Evening Division: tutorial hours arranged.

Political Science 699, Ph.D. Thesis

Day Division: tutorial hours arranged.

See also:

Economics 220, Statistical Methods in the Social Sciences

Economics 340, Problems of Area Development

Economics 440, Public Finance

Economics 450, Economic Fluctuations and Stabilization Policy

Geography 440, Political Geography

History 230, Canada from 1791

History 260, Modern Russia

History 350, British Constitutional History

History 380, History of International Relations, 1900-1939

History 535, Canada Since 1867

Sociology 200, Social Research

Sociology 300, Sociological Theory

Sociology 320, The Ethnography of French Canada

Sociology 345, Power and Stratification

Sociology 350, Political Behaviour

Sociology, 510, Political Sociology

Sociology 525, Canadian Society

Psychology

Professor; Chairman of the Department	R. A. Wendt
Associate Professors	Marjorie N. Donald, P. D. McCormack, L. H. Strickland, F. R. Wake
Assistant Professors	D. K. Bernhardt, A. B. Laver, Marilyn E. Marshall, Anne Replogle, W. E. Walther
Lecturers	Elinor Burwell, R. A. C. Stewart

The program in Psychology is designed to provide a general theoretical and experimental preparation in the discipline. To be employed as a psychologist in Ontario and certain other Provinces it is necessary to have at least one post-graduate degree. Therefore, the program in Psychology is intended to give adequate preparation for graduate training. Students taking an Honours degree may qualify as secondary school specialists and research technicians without further training.

Major Program in Psychology

Year I—English 100 or 101, Philosophy 100 or Humanities 100, a language other than English numbered 100, *Psychology 100*, Mathematics 101.

Year II—*Psychology 205*, at least two other courses in Psychology, and two options [Biology 100 is recommended as one of these.]

Year III—*Psychology 300, 305* and three options.

The minimum requirement for a psychology major is six courses in psychology, (the four compulsory courses italicized above and two others). Students taking a B.A. with a major in Psychology will be required to take a qualifying year in graduate school. Those who are intending to specialize in Industrial, Vocational and Personnel Psychology should include Psychology 210, 260, 335, and 340 in their course of studies. Those intending to pursue careers in experimental psychology should include 210, 310, 320, and 335 as optional courses in Psychology.

Honours Program in Psychology

Year I. As for major in Psychology (In selecting required options appropriate minor subjects for the Honours program should be considered).

Year II. Psychology 205, 310, 210 or 260, plus first or second course in minor subject, one option.

Year III. Psychology 300, 305, 320 (recommended), 335 (recommended), plus second or third course in minor subject.

Year IV. Psychology 405, 420, 400 or 440 or 450, 498 (Honours thesis) plus one further 400 course in Psychology or a 3rd or 4th course in minor subject as required.

The honours program in Psychology may be entered from the Honours first year in the Social Sciences (p. 37) or by transfer from the Pass course if 'B' or equivalent standing has been obtained. To maintain honours standing, a student must continue to obtain 'B' standing or the equivalent in the Honours subjects.

Graduate Studies

M.A. Program

Graduate studies leading to the degree of Master of Arts are offered by the Psychology Department in three major areas of specialization: Learning, Social Psychology, and Developmental Psychology. In addition to his area of specialization, the student will be required to demonstrate competence in Statistics, Measurement, and Experimental Design. The normal program of studies is two years. During the first year a graduate student is required to take five courses, which are determined by the Department, to prepare him for his final year. A graduate student must offer Psychology 200, 300,

305, 310 or 400, 405, 420, 500, 505, or satisfactory equivalents. The two or more remaining courses required to give him a total of eight for the two year period will be offered in his area of specialization. The presentation of a satisfactory experimental thesis, and an oral defence of the thesis, in addition to a minimum of B average in all courses taken as a graduate student are required.

Part-time graduate studies are permitted only for selected students who are resident in Ottawa (or its environs) who cannot attend two years as full-time students. A maximum of three years may be devoted to courses taken as a part-time student, to be followed by a final year in residence which will allow completion of the remaining course requirements and thesis. (See pages 66-68 for general regulations applying to graduate students).

Ph.D. Program

The Department of Psychology will offer the Ph.D. degree to candidates applying for entry in September, 1966. The degree in General Psychology will be concentrated in the area of Learning. Concentration in Social Interaction, Developmental Psychology and other areas will be offered when planned additions of physical facilities and staff are available.

Admissions. Ordinarily, applications are considered only from students holding a Master's degree, or its equivalent, in Psychology, or in a related discipline. Any candidate may be required to take qualifying courses to make up deficiencies, or to complete the Master's degree before entering the Ph.D. program. Candidates must give evidence of satisfactory standing on the Miller Analogies Test and the Graduate Record Examination before being accepted.

General Degree Requirements. The candidate must complete at least two years of full-time study beyond the Master's qualification. At least one of the full-time years of study must follow the passing of the comprehensive examination which ordinarily will be given at the end of the first full year of study. The candidate must also present a suitable thesis.

Special Degree Requirements. As his field of concentration demands, a student is required to give satisfactory evidence of his competence in special areas such as electronics, sampling procedures, computer programming, or surgical techniques.

On the recommendation of his supervisor, a candidate may also be required to show competence in the reading of one or more languages other than English.

Examinations. Each candidate is required to pass a written and/or oral examination covering specified fields in Psychology and a final oral examination on the subject of his thesis and related areas.

A candidate who fails to complete the thesis within five years of his admission must, if he wishes to continue, apply for extension of time.

Psychology 100, Introductory Psychology

An introduction to the scientific study of behaviour. A systematic study of the biological basis of and variables affecting perception, motivation, learning, emotion, and thinking. Students are required to assist in research projects as subjects.

Text: To be announced.
Day Division: Annually (lectures three hours and 1 hour discussion a week).
W. E. Walther
Evening Division: Annually (lectures three hours a week).
R. A. Wendt
Summer, 1965: Day (lectures ten hours a week).
A. A. McKinnon

Psychology 205, Statistics

Descriptive and inferential statistics with application to experimental analysis, problems of test construction, and design of experiments in psychology. (A student may not obtain more than one credit for Psychology 205. Economics 220, and Mathematics 255*-256*).
Text: To be announced.
Prerequisite: Psychology 100 or Sociology 100 (Students are advised to study Walker, Helen M., *Mathematics Essential for Elementary Statistics.*)
Day Division: (lectures three hours a week).
Summer, 1965 (lectures five hours a week).
P. D. McCormack

Psychology 210, Social

Theoretical and methodological approaches to social psychological problems.
Text: To be announced.
Prerequisite: Psychology 100 or Sociology 100.
Day Division: (three hours a week).
Marjorie Donald and L. C. Strickland

Psychology 250, Child Psychology

The growth and development of the child from birth through adolescence. Emphasis is on those processes in the years of early childhood which affect later functioning.
Prerequisite: Psychology 100.
Day Division: (lectures three hours a week).
Evening Division: Not offered, 1965-66.
Elinor Burwell and F. R. Wake

Psychology 260, Theory of Personality

This course deals with theories of personality and considerations of processes of normal and abnormal behaviour. Introduction to techniques of personality evaluation which serve as indicators of normal and abnormal adjustment.
Texts: To be announced.
Prerequisite: Psychology 100.
Day Division:
Summer, 1965 (lectures five hours a week).
D. K. Bernhardt
Evening Division: (lectures three hours a week).
R. A. C. Stewart

Psychology 300, History of Psychology

The growth of psychology as a science. Emphasis is given to the treatment of persisting psychological problems in various theories of the past and the continuing significance of these problems in modern systematic theory.
Texts: To be announced.
Prerequisite: Psychology 100. Open to Third year students only (or permission of the instructor).
Day Division: (seminar two hours a week).
Marilyn Marshall and A. B. Laver
Summer, 1965: Day (lectures ten hours a week).
Marilyn Marshall

Psychology 305, Experimental Psychology

An introduction to psychological research, including an examination of methods, theories, and preparation of reports. A number of experiments will be carried out in the laboratory. An independent research project is the major requirement in second term.
Texts: Woodworth and Schlosberg, Experimental Psychology.
McGuigan, Experimental Psychology.
Prerequisite: Psychology 205.
Day Division: Annually (two two-hour laboratory periods a week).
W. E. Walther and R. A. C. Stewart
Summer, 1965 (lectures five hours a week).
W. E. Walther

Psychology 310, Learning I

The nature of psychological theories. Survey of contemporary learning theories and their significance in the history of experimental psychology.
Texts: Hilgard, Theories of Learning.
Prerequisite: Psychology 100.
Day Division: (lectures 3 hours per week).
A. B. Laver

Psychology 320, Sensation and Perception

The physiological bases of sensation and perception and their relation to the basic psychological phenomena encountered in vision, audition, olfaction, gustation and other senses. Special attention will be given to experimental procedures and the analysis of data. The latter part of the course will be devoted to the philosophical and historic development of perceptual theory and an examination of selected contemporary problems and theories.
Text: To be announced.
Prerequisite: Psychology 100.
Evening Division: (3 hours per week).
Anne Replogle

Psychology 330, Differential Psychology

A critical review of the evidence respecting human differences from psychometric and experimental studies. Group differences associated with class, age, race, nationality, and sex; and individual differences as to aptitude, interest, achievement, and personality.
Text: To be announced.
Prerequisite: Psychology 205.
Elinor Burwell

Psychology 335, Measurement

An introduction to the measurement of human behaviour, dealing with psycholophysical and psychological scaling procedures and with the theory of mental tests.
Text: To be announced.
Prerequisite: Psychology 205.
Day Division: (3 hours per week).
A. B. Laver

Psychology 340, Personnel Psychology

Applications of psychological theory and techniques to problems of organizational functioning and worker motivation.
Text: To be announced.
Prerequisites: Psychology 100. Recommended: Psychology 335.
Day Division: (lectures 3 hours a week).
L. C. Strickland

Psychology 350, Adolescence and Maturity

Psychological growth and development from adolescence through maturity.
Prerequisites: Psychology 100 and 250.
F. R. Wake

Psychology 380, Motivation

A survey of the effects of motivational variables on learning, performance, and perception. Both comparative and human data are considered. Contemporary theories of motivation.
Prerequisite: Psychology 310.
Day Division: (lectures three hours a week).
W. E. Walther

Psychology 398, Contemporary Research Problems

Selected students may be allowed to assist in research being conducted by a member of the department. The student's contribution will consist of assistance in a major project as well as the investigation of related problems. No more than two students may be enrolled for each member of the department in any university year.
Day Division.
Members of the Department

Psychology 400, Learning II

Specification of empirical variables which have been determined as relevant to classical and simple conditioning situations. The empirical relations which hold among these variables and the theoretical structures which have been elaborated in an attempt to account for their derivation. The capacity of such theories to generate hypotheses about more complex learning phenomena.
Text: Hilgard and Marquis (2nd edition), Conditioning and Learning.
Prerequisite: Psychology 310.
Seminar:
Marilyn Marshall

Psychology 405, Advanced Statistical Methods

Simple and complex analysis of variance. An analysis of variance approach to correlation.
Prerequisite: Psychology 205.
Day Division:
P. D. McCormack

Psychology 420, Physiological Psychology

A study of learning, motivation, emotion, and perception in terms of the neural structures and processes involved. Contemporary theory and experimental findings in neuro-physiology and their influence on psychology.
Text: To be announced.
Prerequisites: Psychology 305, Biology 100, and a course in neurology (or permission of the Department).
Day Division:
Anne Replogle

Psychology 440, Group Theory and Research

Contemporary theories concerning the psychological variables underlying interpersonal perception, communication, and interaction in small groups and large scale organizations.
Text: To be announced.
Prerequisites: Psychology 210 and 205.
Day Division:
Marjorie Donald

Psychology 450, Developmental Theories

This seminar is designed to explore various theories of human development in the light of modern theory. Students will be required to present evaluative and comparative papers on the work of various theorists.
Prerequisite: Psychology 250.
Day Division: Seminar.
F. R. Wake

Psychology 498, Thesis for Honours in Psychology

Candidates for honours in psychology will present a thesis, at the end of their fourth year, based on an experimental investigation.
Day Division: Annually (tutorial hours arranged).
Members of the Department

Graduate Courses

Psychology 500, Measurement

Concept formation in empirical science: the logic of physical, psychophysical, and psychological measurement. The mathematical equation as a statement of relation between two metricised variables. Curve fitting as a method of deriving such equations from empirical data, goodness of fit, trend differences, applications of equations in theory construction.
Text: To be announced.
Day Division: Seminar.
Members of the Department

Psychology 505, Research methods in Psychology

Graduate seminar and research in methods and design of experiments. Emphasis will be given to the student's area of specialization.
Text: To be announced.
Prerequisite: Psychology 405.
Day Division only.
Members of the Department

Psychology 510, Learning III

Relevant empirical variables and their demonstrated relations in complex learning tasks; discrimination learning, verbal learning, motor learning, problems of retention and transfer.
Texts: To be announced.
Prerequisite: Psychology 400.
Day Division: seminar.
P. D. McCormack

Psychology 520, Comparative Psychology

Graduate seminar and research.
Prerequisite: Psychology 420.
Day Division:
Anne Replogle

Psychology 540, Problems and Methods in Social Psychology

A survey of current social psychological problems and methodologies for attacking them.
Prerequisite: Psychology 440.
Day Division: seminar.
Marjorie Donald

Psychology 550, Developmental Psychology

Graduate seminar in developmental psychology.
Prerequisite: Psychology 450.
Day Division: seminar.
F. R. Wake and R. A. C. Stewart

Psychology 590, M.A. Tutorial or Directed Studies

Members of the Department

Psychology 599*, M.A. Experimental Thesis

Members of the Department

Psychology 610, Advanced Seminar, Theoretical Topics

Psychology 620, Graduate Experimental Research Seminar

Psychology 699, Ph.D. Thesis

Public Administration

(See Political Science)

Public Law

Professor: Chairman of the
Department   R. O. MacFarlane
Assistant Professors   R. D. Abbott, F. J. E. Jordan
Sessional Lecturers   M. E. Corlett, M. J. O'Grady

Public Law 251 (Commercial Law 100) Commercial Law

The law of contract and agency, sale of goods, negotiable instruments, partnerships and companies, bankruptcy and insolvency, bills of sale and chattel mortgages, conditional sales, bulk sales, bailment, banking, patents, trade marks and copyright, labour relations and other industrial legislation.
Evening Division: Annually (lectures three hours a week).
M. E. Corlett

Public Law 350, The Elements of Law

An introduction to the study of law, designed to acquaint the non-lawyer with the principal institutions, concepts, and classifications of the law, with special reference to Canada.
(Offered in the Department of Political Science as Political Science 350).
Prerequisites: Political Science 100 and either one other course in Political Science or History 350, or permission of the instructor.
Day and Evening Divisions: Annually (lectures and discussion three hours a week).
R. D. Abbott

Public Law 450, Constitutional Law

A study of the nature and limits of executive, legislative, and judicial power in Canada, as interpreted by the courts. The distribution of powers under the Canadian Constitution. (Offered in the Department of Political Science as Political Science 450).
Prerequisites: Political Science 100 and either Political Science 300 or 400, or permission of the instructor.
Evening Division: Annually (lectures and discussion three hours a week).
F. J. E. Jordan

Public Law 451, Company Law

The law relating to corporations and partnerships in Canada; the historical development of the corporate device; rights and duties of officers, directors, and shareholders of the corporation; legal aspects of corporate finance; comparative aspects of corporation law in the U.S., U.K., and Europe.
Evening Division: Annually (lectures and discussion three hours a week).
M. J. O'Grady

Public Law 550, Administrative Law

A study of administrative law in the light of current social and economic problems and relationships and in the light of the trends of modern legislation, with particular reference to Canada. Theories influencing development in the field; delegated legislative and delegated adjudicative powers, their nature and extent, reasons for delegation, dangers; judicial and extra-judicial review and control; administrative procedure; suggested reforms. (Offered in the Department of Political Science as Political Science 550).
Prerequisite: Public Law 350 or permission of the instructor.
Evening Division: Annually (lectures and discussion three hours a week).
R. D. Abbott

214

Public Law 555, International Law

The law concerning relationships among states. Nature and sources of international law. International personality of states; the position of the individual; creation and effect of international obligations; importance and functions of international tribunals in the settlement of disputes. (Offered in the Department of Political Science as Political Science 555).

Prerequisites: Political Science 260 or Political Science 460 or permission of the instructor.

Day Division: Annually (lectures and discussion three hours a week).

F. J. E. Jordan

Religion

Associate Professor;
Chairman of the
Department   L. M. Read
Lecturer   G. W. Ramsey
Sessional Lecturer   Simon L. Eckstein

The general purpose of courses offered in this department is to promote a sensitive and intellectually mature understanding of the basic ideas and concerns of outstanding religious leaders and movements, primarily in the Judaeo-Christian tradition, irrespective of whether these coincide or conflict with individual convictions. Religious writings are studied critically in an attempt to understand their meaning to grapple with their problems, and to assess their significance both in their original cultural context and for our own situation.

As general introduction, students are advised to take Religion 100 or 120 or both. If two or more courses are taken in the department, students are advised to make Religion 120 one of these. In 1965-66 other courses may be taken without previous work in the department.

Major in Religion
Majors in Religion will take Religion 100, Religion 120, and at least three other courses in Religion. Special arrangements will be made for students proposing a combined major program. All majors will arrange their programs in consultation with the chairman of the department.

Religion 100, Introduction to World Religions

A survey of eastern religions: Hinduism, Buddhism, Taoism, Confucianism and Shinto. A survey of "western" religions: Zoroastrianism, Judaism and Christianity (brief review of major emphases only) and Islam. Some aspects of primitive religions and the religions of the ancient Near-East, Greece, and Rome. Representative sociological, psychological, and philosophical theories of the character of religion. (Course credits cannot be obtained for both Religion 320, taken in 1960-61 or earlier, and Religion 100).
Day Division: Annually (lectures and discussion three hours a week).
Evening Division: 1965-66 (lectures two hours a week).
Summer, 1965 (lectures five hours a week).
L. M. Read

Religion 120, Introduction to the Bible

This course will survey the historical background, formation of the literature, and main teachings of the Bible. Text, Canon and translations. The history of Israel and development of Hebrew literature; the major concepts of Hebrew religion; the great prophets; the inter-testamental period. Jewish sects and literature in the New Testament times, including apocalyptic writings and the Dead Sea Scrolls; Hellenistic religion; the contribution of Source and Form Criticism to the interpretation of the Synoptic Gospels; the teaching of Jesus; letters and teaching of Paul; the Johannine writings; the book of Revelation.
Day Division: Annually (lectures and discussion three hours a week).
G. W. Ramsey

Religion 210, The Judaeo-Christian Tradition in Western History

A study of the influence of Judaeo-Christian thought and institutions in the development of Western European civilization. (The course is listed also as History 210). *Not offered*, 1965-66.

Religion 220, The Prophets of the Old Testament

A study of the nature, development and significance of Hebrew prophetism. Psychological aspects of the prophetic experience, including the call, "ecstasy", symbolic actions, and the power of the "word". Investigation of problems such as: the political role of the prophets, relation of the prophets to the cult, distinction of true and false prophets, prediction and fulfillment, compilation of prophetic books. Major attention will be given to the activities and messages of the classical prophets.
Day Division: 1965-66 (lectures two hours a week).
G. W. Ramsey

Religion 225, Records of the Life of Jesus

The course will be concerned with a systematic, critical, and appreciative study of the available records of the life of Jesus. Class periods will be mainly taken up with free class discussions of successive sections of the records making use of H. B. Sharman's Records of the Life of Jesus (containing the synoptic gospels, Matthew, Mark and Luke, in parallel form and the gospel of John with cross references). There will be accompanying lectures and readings on the historical context of the life of Jesus and on the historical context in which the records appeared.
Evening Division: 1965-66 (three hours a week).
L. M. Read

Religion 240, Judaism and the Jewish People

The first half of the course will survey the history of Judaism and the Jewish People from earliest times to the present day emphasizing the major factors, both external and internal, influencing their development. The Biblical period; prophecy; the second commonwealth; the talmudic era; the golden age in Spain; the medieval Jewish community; the modern period; Zionism: the contemporary scene. The second half of the course will review the basic beliefs and practices of Judaism. The thirteen principles of Maimonides; the Synagogue, its rituals and practices; the Jewish home and family; the Jewish holy days, fasts and festivals, dietary laws; marriage and divorce laws; mourning customs; problems, trends and movements in contemporary Judaism. (Course credit cannot be obtained for both Religion 210, if taken in 1960-61 or earlier and Religion 240).
Texts: M. Margolis and A. Marx—A History of the Jewish People.
Isidore Epstein—Judaism.
Evening Division: 1965-66 (lectures two hours a week).
S. L. Eckstein

Religion 300, Philosophy and Religion

(Offered in the Department of Philosophy as Philosophy 300).

Religion 330, Christian Ethics and Society

The ethical teachings of Biblical Judaism, Jesus and the early church, and major types of interpretation of Christian ethics. A number of problems of principle will be studied in detail, for example, law and love, agape and eros, the freedom of man, and the sovereignty of God; and a number of problems of social responsibility, for example, nationalism and war, democracy, and dictatorship. Christianity and the rise of capitalism, Christianity and communism.
Not offered, 1965-66.

Religion 350, Seminar: The Nature and Destiny of Man

With the participation of members of the faculty from the sciences, social sciences, and humanities as well as religion, a critical examination will be made of present and potential contributions of the various disciplines either in conclusions or methodology to an understanding of the nature of man himself and his appropriate destiny.
Prerequisite: Recommendation of a participating member of faculty.
Not offered, 1965-66.

Religion 360, Selected Problems in Interpretation

A course conducted either on a tutorial or seminar basis designed to enable advanced students to pursue interests in selected areas of religion.
Prerequisite: Permission of the Department.
Day and Evening Divisions: 1965-66 (hours to be arranged).
L. M. Read

Hebrew 15, Introduction to Biblical Hebrew

An introduction to the fundamentals of Hebrew grammar, vocabulary and syntax. Consideration of the history of the Hebrew language and the history of the text of the Old Testament. Readings from selected sections of the Hebrew Old Testament.
Text: J. Weingreen, *A Practical Grammar for Classical Hebrew.*
Day Division: 1965-66 (lectures three hours a week).
G. W. Ramsey

Russian

Associate Professor;
Chairman of the
Department   E. M. Oppenheimer
Assistant Professor   J. E. R. Lloyd (on leave of absence, 1965-66),
                         G. Melnikov
Lecturer   P. Varnai
Special Lecturer and
language laboratory
instructor   Emilie Stichling
Sessional Lecturers   G. Belkov, B. Goreloff

Major in Russian

Students may elect Russian as their major, alone or in combination with a suitable subject. A major in Russian consists of a minimum of five courses, excluding Russian 15.

Honours Programs

Combined Honours programs designed to meet the needs of students wishing to teach or go on to graduate work are available in French and Russian and German and Russian. Ordinarily, seven courses, in each language of a combination are required. Information about additional requirements may be obtained from the department. See also p. 30 (General Honours regulations); p. 135 (French); p. 156 (German). The department participates in the Soviet and East European Studies program. For a description of the program and information on required and optional courses in Russian see p. 51.

    The University's language laboratory provides facilities for drill in aural comprehension. Students may take extra practice periods in open hours. The language laboratory is used in the following courses: Russian 15, 100, 201, 301. Oral examinations are given in these courses.

Russian 15, Introductory Russian

Introductory course, the aim of which is to ensure an adequate grasp of the mechanics of the language and basic skill in aural comprehension. Reading of simplified texts and oral practice in the language laboratory.
Texts: Domar: Basic Russian, Book I.
Lermontov, Taman.
Day and Evening Divisions: Annually (four hours a week).
Members of Department
Summer Session: 1965.

Russian 100, Intermediate Russian

Grammar review; composition; oral drill in the language laboratory. Reading of selected poetry and prose.
Prerequisite: Russian 15, or equivalent.
Texts: Domar, Basic Russian, Book II.
Pushkin, Short Stories.
Day and Evening Divisions: Annually (four hours a week).
Members of Department
Summer Session: 1965.

Russian 110, Intermediate Russian (Science Section)

This course is similar to Russian 100, but much of the reading is designed for Science students.
Prerequisite: Russian 15, or equivalent.
Day or Evening Division.

Russian 201, Conversation and Composition

Extensive discussion in Russian; translation into Russian; prose composition; essay writing.
Prerequisite: Russian 100, or equivalent.
Day or Evening Division: Four hours a week.
Emilie Stichling

Russian 250, Nineteenth Century Literature

The emphasis is on prose up to the death of Chekhov, but attention is also paid to previous and later developments.
Prerequisite: Russian 100, or permission of instructor.
Day or Evening Division.
G. Melnikov

Russian 301, Advanced Conversation and Composition

Extensive discussion in Russian; translation into Russian; advanced prose composition and essay writing, with emphasis on stylistics.
Prerequisite: Russian 201, or equivalent.
Day or Evening Division: Four hours a week.
Emilie Stichling

Russian 320, Russian Poetry

Emphasis is on poets of the nineteenth and twentieth centuries.
Prerequisite: Russian 100 and permission of instructor.
Not offered, 1965-66.

Russian 330, Soviet Russian Literature

A survey of Soviet Russian literature since 1917, with special emphasis on the novel and short story.
Prerequisite: Russian 100 and permission of instructor.
Not offered, 1965-66.

Russian 340, Russian Drama

The evolution of Russian drama up to the Soviet theatre. Study of dramatic genres through their principle representatives.
Prerequisite: Russian 100 and permission of instructor.
Day or Evening Division.
G. Melnikov

Russian 350, The Russian Novel

A study of the rise and outstanding development of the Russian novel in the nineteenth century.
Prerequisite: Russian 100 and permission of instructor.
Not offered, 1965-66.

Russian 360, Russian Literature up to Pushkin

Survey of the Kievan and Muscovite periods. Detailed study of eighteenth century prose and poetry.
Prerequisite: Russian 100 and permission of instructor.
Day or Evening Division: 1965-66.
P. Varnai

Russian 490*, Special Subject

Tutorial on topics of Russian literature to be assigned by the instructor in consultation with the students.
Day Division: 1965-66.
Members of Department

Sociology

Professors	John Porter, Francis G. Vallee
Associate Professor; Chairman of the Department	Bruce A. McFarlane
Associate Professors	Muni C. Frumhartz (on leave of absence, 1965-66), Peter C. Pineo, Victor F. Valentine
Assistant Professors	Hyman Burshtyn, Stanley S. Guterman, Donald R. Whyte
Sessional Lecturer	Stephen A. Longstaff

Students who intend to enter Sociology should include Philosophy 100 in the fulfilment of their first-year requirements.

Major Course
Students who major in Sociology are expected to attain a grade of 'C' or better in Sociology 100. Their program will normally consist of at least six courses in the major field, including Sociology 100, 200, and 300 (which are most appropriately taken in the First, Second and Third years, respectively) and at least one additional course at each of the 200 and 300 levels. Final-year students with the requisite standing may be given permission to take a course at the 400 level. It is also expected that some work will be taken in related disciplines, the most important of which are: Economics, Geography, History, Political Science, and Psychology. The whole course program is to be worked out in consultation with the Chairman of the Department.

Honours Courses
Honours programs may be entered from the Honours First year in the Social Sciences (see p. 37) or by transfer from the Major course if the appropriate standing has been attained. Students taking Honours in Sociology are expected to meet the general University regulations governing the degree and to fulfil certain additional requirements depending on the program selected. The following programs are available:

Sociology
The entire selection of courses is to be worked out in close consultation with the Chairman of the Department and is subject to his approval. Normally, the requirements consist of:
1. Ten courses in Sociology, including:
a. Sociology 100, 200, 205, 300, 400, and 498.
b. Four additional courses, at least two of which are at the 300 and 400 levels.
2. A minor consisting of three courses in one of the following: Economics, Geography, History, Philosophy, Political Science or Psychology. (Alternative minors will also be considered).
3. A comprehensive examination at the end of the final year.

Sociology and Political Science
Students intending to enter this program should take Political Science 101 or Sociology 100 (preferably both) in the First year. The choice of courses in subsequent years is subject to the approval of the chairman of the two departments. Normally, the requirements consist of:
1. At least six courses in each of the two disciplines, including:
a. Political Science: 101, 231 and one of 400, 405 or 510; others to be selected in consultation with the Chairman of the Department of Political Science.
b. Sociology: 100 and three or four of 245, 300, 320, 330, 345, 350 and 440.
c. Either Sociology 200 or Political Science 270. (If Sociology 200 is not selected then Sociology 300 is compulsory.)
d. Political Science 498 or Sociology 498 in the final year.

2. A comprehensive examination at the end of the final year.

3. The language requirements for Honours in Political Science.

The program will be so arranged that the student may transfer to full honours in either of the two fields at the end of the Third year, if he then wishes to specialize more intensively.

Consideration will also be given to applications for Combined Honours in Sociology and Economics or in Sociology and another related discipline.

Honours and combined honours students will not be required to write final-year examinations in their Sociology courses.

Graduate Studies

The Department of Sociology offers studies leading to the degree of Master of Arts. A student wishing to enter the M.A. program must have an Honours degree in Sociology (or its equivalent) with at least second-class standing. Otherwise, he will ordinarily be expected to take a qualifying year (of five courses designated by the Department) before being admitted to M.A. candidacy.

A candidate for the M.A. in Sociology will (1) take three graduate seminars within the Department or two graduate seminars and a course at the 400 level, (2) write comprehensive examinations in three selected fields of Sociology, (3) present a thesis, and (4) defend his thesis at an oral examination. Grades of B or better must be obtained in all of these. Normally, the student will also be required to have had training—or, in some other way, to demonstrate his competence—in social research and in statistics before completing his program.

Members of the staff are prepared to supervise thesis in the following areas:

Ethnic Group Relations	Occupations and Professions
Deviant Behaviour	Political Sociology
Family and Kinship	Social Stratification
Mass Communications	Sociology of Education
Native Peoples of Canada	Sociology of Work

The general regulations governing graduate studies are set out on pp. 66-68 of this Calendar.

Sociology 100, Introduction to Sociology

An introduction to the basic principles and concepts of sociological study. An examination of the elements of social structure and of social behaviour—social relations, social groups, cultural norms and values, and institutions—against the background of both simple and complex societies.

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: Annually (lectures and discussion three hours a week).

Summer Session, Evening Division: 1965 (lectures and discussion five hours a week).

Members of the Department

Sociology 200, Social Research

Lectures, seminars, and exercises in sociological method and the techniques of social research. Special attention is paid to sampling, questionnaires and interviews, observational techniques, sociometry, personal documents, and content analysis. During the course the student will apply these techniques to a class research project.

Prerequisite: Sociology 100 or permission of the instructors.

Day and Evening Divisions: Annually (lectures two hours a week and laboratory one hour as required).

H. Burshtyn and . G. Guterman

Sociology 205, Statistics

(This course may be taken either as Economics 220 or as Psychology 205).

Sociology 210, Social Psychology

(Offered in the Department of Psychology as Psychology 210).

Sociology 220, Cultural Anthropology

An examination of the characteristics of human nature, the development and differentiation of human culture, theories relating to culture, society and personality, kinship, language, art, value systems and cultural dynamics.
Prerequisite: Sociology 100 or permission of the instructor.
Evening Division: 1965-66 (lectures two hours per week).
V. F. Valentine

Sociology 240, The Primary Group

An examination of small face-to-face groups and their relationship to the social structure of the larger society. Particular attention is paid to the family, as well as to children's play groups, juvenile gangs, and the industrial working group.
Prerequisite: Sociology 100 or permission of the instructor.
Day Division: 1965-66 (lectures and discussion three hours a week).
P. C. Pineo

Sociology 245, Sociology of Work

A study of the sociological aspects of work, the social organization of industry and business, and the sociology of occupations and professions.
Prerequisite: Sociology 100 or permission of the instructor.
Day Division: 1965-66 (lectures and discussion three hours a week).
B. A. McFarlane

Sociology 300, Sociological Theory

A survey of the history of sociological theory, with special reference to the contributions of Marx, Durkheim, Pareto, Weber, and Parsons. The course also includes an examination of sociological concepts and of selected portions of systematic theory.
Prerequisites: Sociology 100 and Third-year standing.
Evening Division: 1965-66 (lectures and discussion three hours a week).
D. R. Whyte

Sociology 310, Sociology of Deviance

An analysis of the relation of deviant behaviour to the functioning of social systems: conditions and types of deviance from the institutional order, the evasion of rules, the social roles of deviants, the structure of control, punishment and cure.
Prerequisites: Sociology 100 or permission of the instructor.
Evening Division: 1965-66 (lectures and discussion two hours a week).
H. Burshtyn

224

Sociology 320, French Canadian Society

An analysis of the French Canadian way of life, including politics, religion, social structure, cultural values, and literature. Consideration is given both to historical developments and to the contemporary situation.

Prerequisite: Sociology 100 or permission of the instructor.

Day Division: 1965-66 (lectures and discussion three hours a week).

F. G. Vallee

Sociology 330, Culture and Communication

A study of animal and human communication, the relation of language to thought and concept formation, and the functions of linguistic and other forms of communication in small groups. The contrasts between oral and written traditions, between myth in non-literate societies and mass media in urban societies, and the content of contemporary "popular culture" are examined.

Prerequisite: Sociology 100 and, preferably, 220, or permission of the instructor.

Day Division: 1965-66 (lectures and discussion three hours a week).

V. F. Valentine

Sociology 345, Power and Stratification

A study of relations among political, economic and social power; the theories of Marx, Weber, Pareto and Mosca; elites, oligarchies and ruling minorities; bureaucracy and social power; myths and the psychology of social movements; criteria of social class; social class and behaviour; social mobility; and class, caste and ideology.

Prerequisite: Sociology 100 or permission of the instructor.

Day Division: 1965-66 (lectures and discussion three hours a week).

J. Porter

Sociology 350, Political Behaviour

An examination of sociological contributions to the study of political behaviour and of the relations between politics and the social structure. The areas of primary interest include: public opinion, voting and other forms of political participation, the politically revelant aspects of the media of mass communication, and the structure and functions of social and political movements.

Prerequisite: Sociology 100 or permission of the instructor.

Day Division: 1965-66 (lectures and discussion three hours a week).

S. G. Guterman

Sociology 360, Social and Cultural Change

An examination of the conditions which make for changes in social systems. Consideration is given to biological, demographic, economic, technological and socio-cultural factors, as well as to evolution and differentiation, culture contact, theories of historical development, and the idea of progress.

Prerequisite: Sociology 100 or permission of the instructor.

Day Division: 1965-66 (lectures and discussion three hours a week).

B. A. McFarlane

Sociology 400, Sociological Analysis

A review of the basic subject matter of several sub-fields within sociology, with emphasis upon the contrasting theories and methods currently employed.

Prerequisite: Final-year Honours standing or permission of the instructor.

Day and Evening Divisions: 1965-66 (seminar two hours a week).

H. Burshtyn and P. C. Pineo

Sociology 440, Complex Social Systems

A study of complex societies and of their component organizational systems. The first part of the course examines modern society in its associational, mass, and totalitarian modes. The second part is primarily concerned with the formal structure and bureaucratic organization of industry and work, the labour movement, government and politics, education and leisure.
Prerequisite: Final-year Honours standing or permission of the instructor.
Not offered, 1965-66.

Sociology 490, Tutorial in Sociology or Anthropology

A course designed to permit a student to pursue his interests in a selected area of Sociology or Anthropology. The student prepares papers as the basis for discussion with his tutor.
Prerequisite: Final-year Honours standing or permission of the Chairman.
Day and Evening Divisions: Annually (tutorial hours arranged).
Members of the Department

Sociology 498, Honours Thesis

At the end of the final year an Honours candidate is required to present a major essay based upon a supervised research project. The subject for research is arranged early in the year in consultation with the Department and an advisor is assigned. The student is orally examined upon his thesis after its submission.
Prerequisite: Final-year Honours standing
Day Division: Annually (tutorial hours arranged).
Members of the Department

Graduate Seminars

Sociology 500, Sociological Theory

Analysis of selected problems from the standpoint of systematic sociological theory.
Day and Evening Divisions: 1965-66.
F. G. Vallee and D. R. Whyte

Sociology 520, Comparative Social Systems

Comparative analysis of selected features of Canadian, British, and American social structure.
Not offered, 1965-66.

Sociology 525, Canadian Society

An analysis of Canadian social structure and institutions.
Day and Evening Divisions: 1965-66.
F. G. Vallee

Sociology 540, Political Sociology

An examination of the sociological dimensions of power, politics, and political behaviour.
Day and Evening Divisions: 1965-66.
J. Porter

Sociology 599, M.A. Thesis

Members of the Department

226

Spanish

Professor; Chairman of the Department	J. S. Tassie
Assistant Professors	F. Atienza, R. L. Jackson, J. Jurado, C. A. Marsden
Lecturer	R. Ravano
Sessional Lecturers	A. Bégin, J. Claros, Lillian Jackson, A. Lozano, Lorraine Painter, Madeleine Pelletier

The Department offers both Pass and Honours courses to majors. Classes are generally conducted in Spanish, and laboratory instruction, compulsory at the 15 and 100 levels, is available to students in the more advanced language courses. Summer reading is set each year.

Major in Spanish

Interested students must consult with the Department as early as possible to plan their program. General requirements are as laid down on pp. 34 and 35 of the Calendar. A major in Spanish normally consists of four courses after Spanish 100. A student majoring in Spanish is obliged to take either Spanish 200 or 205.

Honours Course

General regulations concerning Honours courses are to be found on pp. 36 and 37. The Honours course in Spanish is designed to give the student a thorough knowledge of Hispanic language and literature. Lectures and seminars cover the origins and evolution of the language, the principal periods of Spanish and Spanish American literature, and include some study of allied literatures in view of further work at the graduate level. The program consists of at least nine courses of which both Spanish 200 and 205 are compulsory. For an explanation of Honours standing, see p. 30.

Honours in French and Spanish

This course is designed specifically for the Interim Type A certificate of the Ontario College of Education. Seven courses are required in each language (including compulsory written and oral work in each year of the program). Spanish 200 and 205 must be taken, and a comprehensive examination (or a series of terminal essays) is to be completed by students during their final year. See also p. 135.

Spanish 15, Introductory Spanish

An intensified course designed to give the student the fundamentals of written and spoken Spanish, together with a general introduction to Hispanic culture. Attendance at both classes and laboratory sessions is compulsory.
Texts: Da Silva: Beginning Spanish (Grammar and tape manual).
Casona: *Corona de amor y muerte*.
Day and Evening Divisions: Annually (lectures and laboratory four hours a week).
Summer, 1965 (lectures six hours a week).
R. Jackson and Members of the Department

Spanish 100, Intermediate Spanish

A course intended to consolidate and supplement knowledge of the language and culture acquired in Spanish 15. Students who take Spanish 100 are expected to have fulfilled certain summer reading requirements.
Prerequisite: Spanish 15 or equivalent.
Texts: Da Silva & Lovett, *A concept approach to Spanish.*
Alarcón, *El sombrero de tres picos.*
El generación de 98.
Day and Evening Divisions: Annually (four hours a week).
Members of the Department
Summer, 1965 (six hours a week).
J. Jurado and C. A. Marsden

Spanish 200, The Civilization of Spain

A survey of Spanish history and culture, with extensive readings from Spanish literature.
Prerequisite: Spanish 100 or permission of the Department.
Not offered, 1965-66.

Spanish 201*, Spanish Conversation

Conversation and discussion of current problems, supplemented by occasional written work.
Prerequisite: Spanish 100 or permission of the Department.
Texts: Da Silva & Lovett, *Al buen hablador.*
Ibáñez, *La barraca.*
Day and Evening Divisions: 1965-66 (two hours a week throughout the year).
F. Atienza and R. Ravano

Spanish 202*, Spanish Composition

A course designed to consolidate the linguistic knowledge attained in Spanish 100, and to inculcate the elements of a good Spanish style.
Prerequisite: Spanish 100 or permission of the Department.
Texts: Levy, *Present-Day Spanish.*
Pequeño Larousse.
Day Division: 1965-66 (two hours a week throughout the year).
F. Atienza

Spanish 205, Spanish American Literature and Civilization

The evolution of Spanish American literature and civilization through the study of representative literary works of all types from most Spanish American countries, from the Colonial deriod to the present day.
Prerequisite: Spanish 100 or permission of the Department.
Principal Texts: Engelkirk, Outline history of Spanish American literature; Anthology of Spanish American literature (2 vols.).
Day and Evening Divisions: 1965-66 (two lectures a week).
R. L. Jackson

228

Spanish 220, The Early Golden Age

Spanish literature from "La Celestina" to Cervantes.
Prerequisite: Spanish 100 or permission of the Department.
Not offered, 1965-66.

Spanish 225, The Later Golden Age

Spanish literature from Cervantes to the end of the XVIIth century.
Prerequisite: Spanish 100 and permission of the Department.
Principal Authors: Alemán, Espinel, Quevedo, Góngora, Gracián, Lope de Vega, Ruiz de Alarcón, Tirso de Molina, Calderón.
Day Division: 1965-66 (three lectures a week).
C. A. Marsden

Spanish 240, Modern Spanish Literature

Spanish literature (of the Nineteenth and Twentieth Centuries) from Moratín to 1936.
Prerequisite: Spanish 100 or permission of the Department.
Not offered, 1965-66.

Spanish 301*, Advanced Oral Spanish

An advanced sequel to Spanish 201*.
Prerequisite: Spanish 201* or permission of the Department.
Texts: Larra, *Artículos de costumbres,* and others to be announced.
Day Division: 1965-66 (two hours a week throughout the year).
J. Jurado

Spanish 302*, Advanced Spanish Composition

An advanced sequel to Spanish 202*.
Prerequisite: Spanish 202* or permission of the Department.
Texts: Jones, *Advanced Spanish unseens.*
Peers, *Extracts for Spanish prose translation.*
Day Division: 1965-66 (two hours a week throughout the year).
J. Jurado

Spanish 325, Cervantes

A study of Cervantes and his age with particular reference to "Don Quijote".
Prerequisites: Spanish 200, 220, or permission of the Department.
Not offered, 1965-66.

Spanish 335, Modern Spanish Theatre

The Spanish theatre from L. F. Moratín to the present.
Prerequisite: Spanish 200 or permission of the Department.
Not offered, 1965-66.

Spanish 340, Modern Spanish Novel

The Spanish novel from La Gaviota to the present day.
Prerequisite: Spanish 200 or permission of the Department.
Principal Authors: Valera, Alarcón, Pardo Bazán, Pereda, Galdós, Blasco Ibáñez, 'Clarín', Unamuno, Baroja, Cela, Fernandez Flórez, Pérez de Ayala, Miró, Concha Espina, Gómez de la Serna, Laforet, Delibes, Sender, Zunzuneguí.
Evening Division: 1965-66 (two lectures a week).
F. Atienza

Spanish 345, Modern Spanish Poetry

Spanish poetry from Bécquer to the present.
Prerequisite: Spanish 200 or permission of the Department.
Not offered, 1965-66.

Spanish 350, The Modern Spanish American Novel

The characteristic works of the most noteworthy novelists of the XXth century.
Not offered, 1965-66.

Spanish 355, Modern Spanish American Poetry

A study of the principal tendencies in Spanish American poetry from the XIXth century to the present day.
Prerequisite: Spanish 205 or permission of the Department.
Not offered, 1965-66.

Spanish 401*, Stylistics

A study of the complexities of modern Spanish syntax based on examples taken from representative authors; stylistic practice in prose composition.
Text: Ramsay, *A textbook of Modern Spanish*.
Prerequisite: Spanish 302* or permission of the Department.
Not offered, 1965-66.

Spanish 410, Old Spanish language and literature

Phonology, morphology and syntax of old Spanish. Textual criticism of major works up to the end of the XVth century.
Prerequisite: Spanish 220 or 302* or permission of the Department.
Principal Texts: Poema del Cid; Libro de Buen Amor; Del Río, Antología (Vol. I); Menéndez Pidal, Gramática histórica española.
Day and Evening Divisions: 1965-66 (two lectures a week).
J. Jurado

Spanish 490, Seminar

A course designed for Honours students in Spanish which will normally be taken in their last year. Topics for individual study and research will be selected according to the interests as well as the requirements of students. Topics previously selected: Federico García Lorca, Unamuno and Existentialism in Spain.

Student Activities and Services

Student Activities

Student Government
All registered students, day and evening, are members of the Students' Association. The Association is responsible for a large portion of student life on campus. As a self-governing body, it has an unusual amount of responsibility and independence in the handling of its affairs. Its functions include providing a channel of communication with the University authorities and with students throughout Canada and the rest of the world.

The legislative body for the Association is the Representative Assembly. Representatives from most years of each faculty are elected to it in winter, to serve from April 1st and in the following academic year. Representatives of Freshmen and other groups are selected in the fall.

The Students' Council is the executive arm of the Association. Five voting members are elected in the winter, to serve from April 1st and in the following academic year. Positions are: President, Vice-President, Comptroller, Student Program Chairman (whose duties include co-ordination of club activities), and Student Relations Chairman (whose duties include assisting foreign students at Carleton to become acquainted with Canadian university life).

The Association sponsors a wide variety of activities. Clubs, musical and dramatic societies, publications, social functions, and other recreational and cultural undertakings constitute the extra-curricular student program.

The Students' Association has been entrusted with a great deal of responsibility for the behaviour and discipline of its members in the non-academic areas of University life. For this reason, students are expected to adhere to the rules and regulations of the Association. Student conduct is governed by a modified Honour System. While there is no compulsion to report those who commit infractions, enforcement of the system depends upon the initiative of the students themselves. Administration of the system is the responsibility of two bodies, an Honour Board (whose duties include education, investigation and prosecution) and a Judicial Committee.

Athletics
The athletics program is controlled jointly by the Students' Association and the University administration. The governing body is the Athletic Board, consisting of four student representatives and four members of faculty and administration. A wide variety of intramural and intercollegiate sports is offered. There is a student Interfaculty Council to regulate intramural team competition.

University Union
Facilities for lounging and recreation are provided in the gymnasium building which serves as the temporary Union. A large, centrally-located Union building is in the process of being planned by the University in co-operation with the Students' Association.

Student Services

Housing

The University's two residence halls, Lanark House and Renfrew House, accommodate 315 women. Grenville House and Russell House, to be completed in September 1965, will accommodate 360 men. The rooms are furnished, including blankets and linens. Board and room for the academic year is $703.00 for single, and $678.00 for double rooms. For information and application forms, write the Provost of Residences, 1231 Colonel By Drive, Ottawa 1.

Students who will be living off campus can obtain assistance in securing accommodation through the Student Personnel Officer. Typical rates for such accommodation are from $35.00 to $75.00 per month depending upon arrangements made for meals. Experience has shown however that living expenses for students are generally equivalent whether one lives off-campus or in residence.

Approximate Cost of One Year (8 months) at the University

1. Tuition: Arts, Commerce, Journalism, Science	$515
Engineering	$575
2. Books, Instruments, and Supplies	$40-100
(The maximum named is typical for second-year Engineering Students)	
3. Board and Room in Residence	678-703
4. Board and Room off-campus—2 meals in home, luncheon in University Cafeteria	$ 675
5. Clothes, Laundry, Entertainment, Transportation	200-300
Total	$1430-1678

Food

The University Commons contains a cafeteria for those desiring full meals and a snack bar for short orders. Those wishing to eat all their meals at the Commons may do so at the regular contract rate.

Health

The University Health Service is provided to protect and promote the health of the student body. This service, under the supervision of the Medical Adviser, ascertains the fitness of students to do academic work and to participate in such activities as athletics, consults and advises students on matters of health, and provides treatment and care in the case of emergency or minor illnesses.

At registration each full-time student is required to submit, on a personal health record form provided by the University, a certificate of medical examination performed by his family physician.

Each year, in addition, a full-time student will submit evidence at registration of having had a chest X-ray within six months prior to the opening of classes, or as an alternative to such chest X-ray a negative intracutaneous tuberculin skin test. Students electing to have the skin test in lieu of chest X-ray are advised to have such test conducted by the family physician at the time of the medical examination. Students who are tuberculin positive will be required to undergo a chest X-ray as above. Chest X-rays may be arranged, free of charge, at the May Court Clinic, 374 Besserer Street, Ottawa, at any time after May 15. (Carleton students may be examined, except in July, on Tuesday, Wednesday, or Thursday, 1:30 to 4:00 p.m.).

(Students who object to these examinations on conscientious grounds must provide the Medical Adviser, after consultation, with a written statement of the grounds on which they object).

Before participating in University athletic activities students must be certified physically fit by the Medical Adviser. The University is not responsible for expenses incurred as a result of injuries sustained by students while participating in athletic activities. Information regarding accident insurance is available in the Office of the Director of Athletics.

Students wishing assistance in planning their educational programs or in choosing a career should see: a) their Faculty Adviser b) administrative officers, particularly the Deans, the Registrar, the Dean of Students, the Student Counsellor, or the Student Personnel Officer. The Registrar serves as Adviser for Overseas Students, who are invited to consult with him.

The Registrar is available for consultation each Tuesday evening from 6:30 to 8:30 in addition to his regular daytime office hours.

The Student Counsellor is available for counselling in personal problems.

Placement

Students wishing assistance in obtaining part-time, summer, or permanent employment should consult the Student Personnel Officer. This service, also, is available to the alumni of the University.

Military Training

Qualified young men to serve as officers in Canada's Armed Forces are a continuing need. The professional ability required of present-day officers demands the best in education and training. The Department of National Defence therefore sponsors two programs for selected numbers of students who have the potential to become officers in the Royal Canadian Navy, the Canadian Army, or the Royal Canadian Air Force. The two programs are: (I) training in the Reserves, carried on in the Universities, and (II) the Regular Officer Training Plan carried on either in the Universities or in the Tri-Service Colleges.

I) University Reserve Units

a) General. The University Reserve Units are organized as sub-components of the Reserves of the three services as follows:

i) Royal Canadian Navy—University Naval Training Division (UNTD);

ii) Canadian Army—Canadian Officers Training Corps (COTC);

iii) Royal Canadian Air Force—University Reserve Training Plan (URTP).

b) Role. The role of the University Reserve Units is:

i) To introduce the University undergraduates to service life so that they may make an intelligent appraisal of the advantages of a service career in one of the Regular Forces;

ii) To provide selected University undergraduates with the training necessary to qualify them for commissioned rank in the Regular or Reserve forces; and

iii) To engender in University undergraduates an awareness of the needs, problems and responsibilities of the Armed Forces of Canada, and an understanding of their role.

c) The training Program is divided into two Theoretical and two Practical phases. Selected officers of each service will be given a third theoretical and practical phase of training. Each theoretical phase consists of 64 hours of instruction at the University during the academic year. The practical phases each consist of 12 to 15 weeks of training taken at a Service School or unit of the Regular Service. This practical training in interesting fields will reinforce certain university courses and, in some cases, credits are obtained to meet university requirements.

d) During summer training the undergraduate receives regular pay. Transportation, uniforms, meals, and accommodations are equal to that provided for all officers of the Regular Forces. The officer cadet also receives medical and dental care while on summer training. During the University year, undergraduates may earn up to 16 days' pay for training completed.

e) Upon successful completion of training, cadets are commissioned, and may be considered for service in the Regular Forces or the Reserves.

234

II) *The Regular Officer Training Plan*

1. The Department of National Defence, through the Regular Officer Training Plan (ROTP), sponsors a program of university education and leadership training for selected numbers of young men who have the potential to become officers in the Royal Canadian Navy, the Canadian Army, or the Royal Canadian Air Force.

2. Candidates with senior matriculation, junior matriculation, or who are university undergraduates taking suitable courses, are eligible to apply for enrolment as officer cadets in the Service of their choice. The admission standards are high, but for those who qualify, the way is open to a challenging and rewarding career. Students who are selected for the ROTP while attending university will be enrolled in the Service of their choice while continuing their university studies.

3. Training in the ROTP is divided into two parts. Cadets attend a Canadian Services College or a University throughout the academic year and then go to a unit or training establishment of their Service for training each summer.

Academic Training

4. In general terms, the courses which are needed in business and industry are also required in the Armed Forces. The following are broad patterns:

Engineering—Civil, Mechanical, Electrical, Engineering Physics, Chemical.
Arts—General, Honors.
Science—General, Honors.

Other specialist courses which may be required by the Armed Forces. (If any course exceeds four years, the student may be accepted for his final four years only).

Conditions of Service

5. Successful applicants will be enrolled as Naval cadets in the Royal Canadian Navy, Officer cadets in the Canadian Army (Regular) or the Royal Canadian Air Force, according to their preferences. Cadets are obliged to maintain good standing academically and in military training. A cadet who fails a year, or who lacks adequate standing in a subject from a previous year, loses his benefits. On the recommendation of his faculty, he may be permitted to repeat one year at his own expense and, if successful, be re-instated.

6. An Officer cadet who graduates, and has successfully completed his Service training program during the summer months, is promoted to the commissioned rank of Sub-Lieutenant in the Royal Canadian Navy, Lieutenant in the Canadian Army (Regular) or Flying Officer in the Royal Canadian Air Force (ranks are equivalent).

Financial Assistance

7. Tuition and other essential fees are paid by the Department of National Defence. Officer cadets attending university receive an allowance of $75.00 each year to purchase books and instruments.

Scale of pay and allowances for ROTP cadets is:

Pay (all Officer cadets) _____ $73.00 per month.

Living allowance (university cadets only) _____$65.00 per month.

Free medical and dental care is provided. Annual Leave (30 days plus travelling time) with pay and allowances may be granted each year, usually after the summer training period.

8. An applicant must have the following qualifications:

Citizenship

—be a Canadian citizen or a British subject resident in Canada with the status of a landed immigrant.

Marital Status

—be single and remain so until commissioned.

Medical

—be physically fit for enrolment in the Service of his choice.

Age

—have reached his 16th birthday, but not his 21st birthday on the first of January of the year of entrance if applying with senior matriculation; or his 20th birthday if applying with junior matriculation. Consent of a parent or guardian is required if he is under 18 years of age.

How to Apply

9. Application should be made through the Commanding Officer of the university unit on campus, through the Resident Staff Officer on campus or local recruiting officer of the services.

Each University Unit has its own mess. Although the University messes do not include living quarters, in other respects they may be regarded as a home for all officers of the Unit. The mess serves as the centre for the formal and informal social events which form part of the program.

Students interested in these training programs are requested to inquire of the service representatives listed below:

Navy:	Staff Officer, U.N.T.D., H.M.C.S. Carleton, Dow's Lake, Ottawa, Ontario; Tel. 99-4-5044
Army:	Officer Commanding, Major J. M. Holmes, C.D., Department of Chemistry, 234-8433. C.O.T.C. Office, Telephone 234-4123
	Resident Staff Officer, Capt. J. G. R. L. Brisebois, C.D., 234-4123 or 99-2-7623
Air Force:	Resident Staff Officer, 112 University Squadron, R.C.A.F., 162 Waller Street, Telephone 99-2-8615
	University Squadron Support Officer, Flight Lieutenant P. M. Laughton, C.D., Department of Chemistry, 236-2763.

Index to Medals, Scholarships, Prizes, Bursaries, and Loans

MEDALS

SCHOLARSHIPS

PRIZES

BURSARIES

LOAN FUNDS

Academic Awards
and Financial Assistance

Medals are the major academic awards granted by the University to its superior graduating scholars. They have no monetary value.

Scholarships are awarded to students on entry to the University and to those in course on the basis of superior academic performance. Those with the highest scholastic standing are granted the scholarships having the highest monetary value. Application must be made for entrance scholarships by May 1, but scholarships are awarded to those in attendance at the University on the basis of merit, without application. An exception is the Mohr Scholarships for undergraduates.

Fellowships are awarded to students entering or in graduate studies at the University. Limited teaching duties are usually required of Fellows.

Prizes are awarded for excellence in particular areas of study. They may be cash awards or book prizes. No application is required.

Bursaries are awarded to students who can show genuine evidence of financial need and who have above average standing. Applications for bursaries should be made to the Student Personnel Officer not later than August 15.

Loans are awarded to students with satisfactory academic records who could not continue their studies without financial assistance. Applications for loans should be made to the Student Personnel Officer not later than August 15.

Financial Aid for Students

1. *Source of Funds.* Funds for scholarships, prizes, bursaries, and loans are provided by the University and by gifts from individuals and associations. The University welcomes the offer of scholarships, prizes, medals, and bursaries. The Registrar will be glad to send, on request, information as to the functions of scholarships and bursaries, and also a statement of particular needs at present in the financial aid program of the University. Scholarships, prizes, medals, bursaries, and loan funds may be accepted from donors at the discretion of Senate on appropriate recommendation of the President.

2. *Administration of Awards.* Awards of medals, scholarships, and prizes will be made by Senate to qualified candidates of merit; but the Senate may withhold any such award if no candidates of merit present themselves. The award of scholarships, prizes, and medals shall be final when formally announced by the University.

3. The standing of students being considered for any such awards shall be determined on the basis of courses taken for credit and shall not take account of extra courses being taken for no credit.

4. (a) No limitation shall be placed upon the number of prizes and medals which any one student may win in any one year. (b) A student may be declared the winner of as many scholarships as he may win as a qualified candidate of merit but, in the case of awards carrying a major financial amount, such student will normally receive the proceeds only of the largest among these major amounts. (c) Winners of scholarships and prizes may resign the monetary value but retain the honour of such awards, and their names will be published as winners. In cases arising under 4(b) or 4(c), the monetary amounts so relinquished may be awarded by reversion if merited.

5. A scholarship application will not be considered if the candidate has also applied for entrance scholarships at other universities.

6. Scholars who hold continuing scholarships at Carleton University must maintain a level of academic performance each year satisfactory to the Committee on Admission and Studies, or relinquish their scholarships.

7. Students receiving scholarships and bursaries exceeding in total $200 which are under the jurisdiction of the University will ordinarily be paid in two instalments,

one in October and one in January. The University reserves the right to withhold the payment of the second instalment if the attendance or conduct of the student is not satisfactory. Awards of less than $200 will ordinarily be paid in one instalment, in October.

8. The University does not guarantee the award of any scholarship, prize, medal, or bursary other than those created from funds of the University. Those awards based upon gifts of individuals or associations other than the University will be forwarded only after the funds required have actually been received from the donors.

9. One application form only is required for all entrance scholarships listed under Scholarships.

Awards for Academic Excellence

Medals

The Governor-General's Medal
Awarded annually, to the student standing at the head of the graduating class.
Donor: His Excellency the Governor-General of Canada. Established 1952.

University Medals
Awarded annually, when merited, to the graduating students standing highest in Arts, Science, Commerce, Journalism, and Engineering. Established 1949.

Senate Medals
Awarded, when merited, to graduating students of outstanding academic achievement. Established 1952.

Medal in Engineering (Ontario Association of Professional Engineers)
Awarded annually, when merited, to the graduating student standing highest in Engineering. Established 1961.

Scholarships

I. Entrance Scholarships Tenable at Carleton University
Henry Marshall Tory Scholarships
Three entrance scholarships, of a total maximum value of $2000 each ($500 a year for a maximum of four years) have been established by the University, for open competition among students entering Carleton University at either senior or junior matriculation level.
Established 1961, and named to commemorate the first president of Carleton University, Dr. Henry Marshall Tory.

University Entrance Scholarships
Nine entrance scholarships, of a total maximum value of $1200 each ($300 a year for a maximum of four years) have been established by the University for competition among the students entering the First year of Arts, Journalism, Commerce, Science, or Engineering from the collegiate institutes or high schools under the direction of the Ottawa Collegiate Board and from the secondary schools of the Ottawa counties adjacent to the city.
These nine University Entrance scholarships, together with the four Mercy Neal Southam Entrance scholarships (described immediately below) will constitute each year thirteen scholarship awards to be granted on the following basis: one scholarship to the applicant with highest standing from each of the Ottawa schools; one scholarship to be available for competition among able students from the secondary schools of Renfrew, Russell, Prescott, Glengarry, Stormont, Dundas, Grenville,

242

and Leeds; and one other University scholarship offered for general competition among the city and county schools. The order of award among the schools will be on merit; and in the case of any school where it happens in a given year that none of the candidates nominated qualifies, the University reserves the right to allot the scholarship elsewhere.

Candidates from the secondary schools must write at least six Ontario Grade XIII final examination papers in the year of application and will be judged on their eight best papers selected from among those required for admission to the faculty the student plans to enter at Carleton University.

Mercy Neal Southam Entrance Scholarships

Four $500 scholarships will be awarded annually, if merited, to students entering the First year of Arts, Journalism, Commerce, Science, or Engineering at Carleton University.

The conditions of award and administration of the Mercy Neal Southam Entrance scholarships will be the same as those governing the University Entrance scholarships (described immediately above) except that each scholarship will be payable in two successive annual instalments of $250, subject to scholarly performance.

Established in 1949 under the terms of bequest of the late Wilson Mills Southam, the scholarships are in memory of his grandmother, Mercy Neal Southam.

Government of Ontario Scholarships

The Government of Ontario has authorized the award of a number of Ontario Scholarships to students who show outstanding ability as evidenced by their results on the annual Grade XIII Departmental examinations.

Ontario Scholarships of the value of $400 may be awarded to applicants who obtain an average of not less than 80 per cent on eight papers of the Grade XIII Departmental examinations (including both papers in English), all written in the year of application, and who enrol in an eligible institution in September, 1965. Scholarships announcement and application forms have been sent to the schools.

General Entrance Scholarships

Twelve scholarships of a value of $300 each for one year have been provided by the University for general competition among students entering Carleton University at the Senior and Junior Matriculation level. Established 1963.

Union Carbide Canada Ltd. Undergraduate Scholarships

Tenable for four years, each Union Carbide scholarship has a maximum value of $2500, payable $700 the first year and $600 in each subsequent year. Should the academic course be of less than four years duration, the scholarship will terminate with graduation. It may also be terminated any time if the student fails to meet the requirements of the University. Two Union Carbide scholars are maintained in attendance at Carleton University.

Awarded to male graduates of secondary schools who (1) have good scholastic standing and personal reputation and are recommended by their school authorities; (2) will be enrolling in an Engineering, Physical Sciences, Commerce, or Business Administration course, with a view to entering business, industry, or the field of education upon graduation; (3) possess superior talent and ability (financial need is important but not paramount); (4) do not receive scholarship awards from other sources exceeding $200 in one year.

Donor: Union Carbide Canada Limited. Established 1954.

The Ottawa Citizen Scholarship

A scholarship valued at $1200 will be awarded annually, if merited, to a student entering Carleton University from a high school in any one of the following counties in the Ottawa district: nine in Ontario—Carleton, Dundas, Glengarry, Grenville,

Lanark, Prescott, Renfrew, Russell and Stormont—and four in Quebec—Gatineau, Hull, Papineau and Pontiac.

Candidates with junior or senior matriculation may apply for admission to Qualifying University or First year of Arts, Commerce, Journalism, or Science.

Candidates with senior matriculation may apply for admission to Engineering.

A student admitted with junior matriculation standing will receive $300 per year for a period of four years; a student admitted with senior matriculation standing will receive $400 per year for a period of three years; always provided that, in both cases, the student is registered as a regular full-time student of Carleton University and maintains a satisfactory academic standing.

A candidate for this scholarship must present evidence of high scholastic attainment, together with a record of outstanding participation in the extra-curricular activities of his school.

Donor: The Ottawa Citizen. Established 1955.

The Duchess of Connaught Scholarship
The yield from the endowment of this historic scholarship, amounting to approximately $350 annually, has been made available to Carleton University by the Laurentian Chapter, I.O.D.E. The scholarship is to be awarded to an able student entering Carleton University, and may be held until graduation, if merited; at which time a new award will be made.

Donor: Laurentian Chapter, I.O.D.E. Established at Carleton University, 1960.

Ottawa Business and Professional Women's Club Scholarships
1) A scholarship of value $200 to be awarded to a girl entering Carleton University with high Grade 13 standing from one of the high schools or collegiates administered by the Collegiate Institute Board of Ottawa: and choosing the Arts course with the intention of going into one of the professions other than the field of Science.

2) A scholarship of value $200 to be awarded to a girl entering Carleton University with high Grade 13 standing from one of the high schools or collegiates administered by the Collegiate Institute Board of Ottawa: and choosing a course leading to a degree in Science.

Donor: Ottawa Business and Professional Women's Club. Established 1963.

School of Public Administration Scholarship
Value $500. Awarded, preferably to a public servant, for full-time study toward the Certificate in Public Service Studies. For details regarding application, see p. 249.

Regional Entrance Scholarships
Value $1600 each. Four are awarded annually, if merited, on the basis of outstanding achievement in secondary school studies, to students entering Carleton University with junior or senior matriculation standing on the following distribution:

(a) Two scholarships available for Ontario (except the city of Ottawa), and the Western Provinces and Territories.

(b) Two scholarships available for Quebec Province and the Maritime Provinces.

Each scholarship winner will have $400 applied to the cost of tuition at the time of registration in his first year at Carleton University, and, if he is still in attendance and making progress satisfactory to the Scholarships Committee, $400 at the time of registration in each succeeding year, not exceeding four years in all.

These scholarships were established by the University in 1952.

International Nickel Company Scholarship
One entrance scholarship has been established by The International Nickel Company of Canada, Limited, restricted to study in the fields of engineering, geology, geophysics, mathematics, chemistry, and physics. The scholarship covers tuition fees, a grant of $300.00 to the student, as well as a cost-of-education supplement of $500.00

244

to the University. The maximum award for a scholarship is $1,200.00. Any graduate of a high school or the equivalent, or any student in his final high school year, who has good scholastic standing and personal reputation, is eligible to apply. It is awarded by the University Scholarships Committee on the basis of the applicant's record, character, and financial need. The scholarship is renewable annually to the student for a maximum of three additional academic years or, in certain cases, until graduation, whichever is the shorter period. Further details from the Registrar.
Donor: The International Nickel Company of Canada, Limited. Established 1956.

W. Sparks & Son Ltd., Entrance Scholarship
Value $500.00. Awarded annually to an entering student of superior scholarship who is the child of a Canadian Government employee serving outside Canada; or who has served overseas immediately prior to the application of his child, or who will be serving overseas in the future immediately following such application.
Donor: W. Sparks & Son Ltd., Ottawa. Established 1960.

E. B. Eddy Company Continuing Scholarships
Two scholarships each of value $600 a year until graduation. Each scholarship is open to a graduate, preferably male, of a Canadian secondary school, who has high scholastic standing in his senior matriculation examinations. Each scholarship is awarded by the University and retained, if merited, until graduation, at which time the next E. B. Eddy Scholar will be named.
Donor: The E. B. Eddy Company. Established 1959.

The D. Roy Campbell Entrance Scholarship
Value $500. Awarded annually for a period of ten years, under the terms of the will of the late D. Roy Campbell, for competition among students entering Carleton University with high standing in the senior matriculation examinations or the equivalent.
Donor: The late D. Roy Campbell. Established 1962.

The Dr. Frederick William Charles Mohr Scholarships
Twenty-six scholarships of a maximum value of $500 each have been made available for annual competition among students entering Carleton University or proceeding from one year of course to another at the University, and who come from communities within the following Ontario and Quebec counties:
Ontario: Renfrew, Russell, Prescott, Glengarry, Stormont, Dundas, Grenville, Carleton, Lanark, Nipissing, Leeds.
Quebec: Pontiac, Gatineau, Hull, Papineau, Argenteuil, Temiskaming.
These awards are provided through the bequest of the late Dr. F. W. C. Mohr.
The scholarships will be awarded by the University on the basis of high academic performance and of financial need. It is necessary to make specific application for these scholarships, and forms for this purpose may be obtained at all times from the Registrar's Office.
Donors: The Frederick W. C. Mohr Estate. Established 1963.

Association of Professional Engineers' Entrance Scholarship
Value of $500. Awarded annually to a Grade XIII student of high proficiency who is entering the engineering course.
Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961.

James H. Rattray Memorial Scholarships
Value $200 each. Two scholarships awarded annually to a student entering the first year Engineering at Carleton University.
Donor: The late James H. Rattray, M.C. Established 1961.

Canadian Waterman Foundation Scholarships
Ten scholarships of $100, one in each of the ten Ontario universities, including Carleton University, will be presented to the student among those admitted to the university who ranked highest at the Ontario Grade 13 examinations in the year of the award according to the conditions of the Foundation Scholarship Committee.
On September 1 the University Registrar will be asked to declare to the Department of Education the name of the Ontario student ranking highest among those admitted to Carleton University. The Department in its turn will notify the Foundation so that cheques in favour of the winner may be sent to the school principal.

II. Scholarships for Undergraduate Competition

J. P. Bickell Foundation Scholarships
The Trustees of the J. P. Bickell Foundation have established in the Department of Geology, Faculty of Science, scholarships for students entering the Geological profession, of a possible value of $1,500 each. The Scholarships may be awarded on entrance into the Honours Geological sequence at the First, Second or Third year levels at Carleton University. The scholarships are payable over two or three years depending on the entrance level.
Application must be made to the Chairman of the Department of Geology by May 15. In order to be eligible, the applicant must undertake to register in the Honours Geology sequence with a minor in Biology, Chemistry, Mathematics, or Physics; or a combined Honours sequence of Geology and one of the above-mentioned subjects.
Full particulars and application forms may be obtained from the Registrar of the University.

Alcan Scholarship
A scholarship has been established by the Aluminum Company of Canada, Limited, restricted to students proceeding to a degree in Honours Chemistry, Mathematics or Physics, in Engineering Physics, or Mechanical Engineering.
The award will normally be in the amount of $500 to the student, with an additional grant of $200 to the university; it is made by the University Scholarships Committee on the basis of the applicant's record, character and financial need. The holder of the scholarship may reapply for it in the following year and will be considered on an equal basis with other students.
Donor: The Aluminum Company of Canada, Limited. Established 1964.

C.U.S. (N.F.C.U.S.) Interregional Study Exchange Plan
Since 1952, Carleton University has participated in the Interregional Study Exchange Plan sponsored by the Canadian Union of Students.
Each year, six students from universities other than English-language institutions of Ontario and Quebec may be granted free tuition at Carleton for the studies of their penultimate year. At least two Carleton students may be chosen from among those who apply for permission to study, tuition free, at French-language universities in Quebec, or universities of the west coast, the prairies or the Maritimes.
Carleton students wishing to apply for participation in the plan should consult the Registrar before January 15. Selection will be made by a committee composed of the Dean of the Faculty of Arts, the Registrar, the President of the Students' Council, and the External Affairs Chairman of the Students' Council. All applicants will be subject to the approval of the host university.

Maxwell MacOdrum Scholarships
Fourteen scholarships, of a value of $400 each, have been provided by the University for annual competition among undergraduates in the various disciplines. Each scholarship will be awarded on a basis of outstanding performance, and will be retainable for one year.

The scholarships are named in memory of Dr. Maxwell MacOrum, second president of Carleton University. Established 1961.

Carleton Alumni Association Scholarships
Scholarships totalling $3,000 have been provided for undergraduates passing from one year of course to another at Carleton University with high standing. Certain of the scholarships are reserved for students in honours.

Donor: The Alumni Association of Carleton University.

The James A. Gibson Scholarships
Scholarships totalling $1,000 have been provided for superior students passing into the final year of the undergraduate course at Carleton University. The scholarships are named in honour of Dr. James A. Gibson, former Dean of the Faculty of Arts and Deputy to the President of Carleton University.

Donor: The Alumni Association of Carleton University.

The Arthur A. Crawley and Company Scholarship
Value $500. Awarded annually, if merited, to the student obtaining the highest average marks in second year Commerce, or in second year Arts (Economics), who proposes to pursue upon graduation the course given by the Institute of Chartered Accountants of Ontario. The scholarship is of value of $500, payable $250 at time of registration for the third year course at Carleton University, and $250 on January 2nd following, provided the student is in good standing at Carleton University.

Donor: Arthur A. Crawley and Co., Ottawa. Established 1964.

Association of Professional Engineers' Scholarship
Value $250. Awarded annually to an engineering student of high proficiency proceeding from one year of course to another in Carleton University.

Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961.

Touche, Ross, Bailey and Smart Scholarship
This scholarship is in the amount of $250. It will be awarded to a student who is entering the final year of the degree course in Commerce, and who intends upon graduation to study for the qualification of Chartered Accountant. The award will be made to the student whose character, ability, academic records, and other qualities are, in the opinion of the Committee on Commerce Studies, those needed by a Chartered Accountant. Applications should be submitted to the Chairman of the Commerce Studies before March 1.

Gyro Club of Ottawa Scholarships
Value $250. Two scholarships have been made available annually for grade 13 male students entering Carleton University each fall. The scholarships are designed to recognize students who obtain first-class standing in the Ontario Senior Matriculation, but who do not attain a standing normally sufficient for university entrance scholarship competition. They are presented, if merited, to two top pupils in the 75% to 79.9% class only, or with a total mark of less than 640 in eight papers including English Literature and Composition, and who have completed their grade 13 in Ontario in one year. Ontario Scholarship winners are not eligible. Established 1964.

The scholarships are externally awarded, the selection being made by a committee appointed from the members of the Gyro Club of Ottawa.

The Hume Wrong Scholarship
Value approximately $225, being the yield of a fund of $5,000, established by Mrs. Hume Wrong in memory of her late husband. Awarded annually to the leading student in third year History or Political Science, proceeding to his or her final honours year.
Donor: Mrs. Hume Wrong. Established 1962.

Gavin Scott Macfarlane Memorial Scholarship
Value $200. To be awarded annually to an outstanding student, preferably in honours, who is proceeding from one year of course to another in Carleton University.
First donated 1957, by Mrs. G. S. Macfarlane in memory of her husband, Lieutenant-Colonel Gavin Scott Macfarlane.

Lord Dundonald Chapter (I.O.D.E.) Scholarship
Value $100. Awarded annually to a student of superior standing and general proficiency, entering the final year of a degree course at Carleton University.
Donor: Lord Dundonald Chapter, I.O.D.E. Established 1956.

Ottawa Women's Canadian Club War Memorial Scholarship
Value approximately $100. Awarded annually to a student progressing from Qualifying University year to First year in Carleton University. Preference is given to veterans or their children. Endowed 1946.

Clendinnen Scholarship in Biology
Value $100. Awarded annually to an outstanding student proceeding from the Third to the Fourth year of the honours course in biology at Carleton University.
Established 1951, in memory of Mr. and Mrs. T. E. Clendinnen, by their daughter.

Ottawa Woman's Club Scholarship
Value approximately $225. Awarded annually to an outstanding woman student progressing from one year to another in Carleton University.
Established 1952, endowed 1964, by The Ottawa Woman's Club.

University Women's Club of Ottawa Scholarship
Value $100. Awarded annually to a deserving woman student progressing from one year to another. Established 1952, in honour of Dr. Alice E. Wilson, by The University Women's Club of Ottawa.

The Charles Anthony Blundell Betts Memorial Scholarship in Physics
Value approximately $450. To be awarded annually, if merited, to a student of high proficiency in Physics, entering or continuing in Physics Honours or in the Major Course, in the second or subsequent years of the degree course.
Donors: Mr. and Mrs. Oliver Betts, Birmingham, England, in memory of their son, Charles Anthony Blundell Betts. Established 1964.

C. V. Hotson Memorial Scholarship
Value $100. The C. V. Hotson Memorial Scholarship, awarded annually to an undergraduate student, who maintains high academic standing and is active in student affairs. Donated by Carleton Alumni and other friends in memory of Mr. Hotson, a 1950 Carleton Journalism graduate and former member of the Students' Council who returned to Carleton in 1953 to become Administrative Assistant to the President and Executive Secretary of the Alumni Association, positions he held until his death in October, 1960.

Regent Vending Machines Ltd., Scholarships
Two scholarships of value $100 each. One scholarship is awarded annually to an outstanding student in Engineering proceeding from the first to second year in the Engineering curriculum; and the second scholarship to such a student proceeding from the second to the third year of the curriculum.
Donor: Regent Vending Machines, Limited. Established 1954.

Riddell, Stead, Graham and Hutchison Award
This award is given to a student who is completing his pre-graduating year and is proceeding on to his graduating year. The form of the award is the payment of the student's tuition fees for his final undergraduate year at Carleton. The award will be made to the student whose personality, ability, academic record and other characteristics are, in the opinion of the Committee on Commerce Studies, those needed by a Chartered Accountant.

The Leonard Foundation Scholarships
The Leonard Foundation Scholarships are awarded each year to select students in Canadian universities and colleges, including Carleton University. Awards are based on certain areas of preference.
Applications must be submitted by March 1 to the Registrar on special forms which may be obtained from the Student Personnel Officer.

National Press Club of Canada Scholarship in Journalism
A sum equal to tuition fees to be awarded annually to a student enrolled in the final year in Journalism at Carleton University. Applications must be in the hands of the Registrar, Carleton University, by August 15 of the year in which the scholarship is awarded.
Donor: The National Press Club of Canada. Established 1965.

III. Post-Graduate Awards Tenable at Carleton University:

General:
Carleton University offers annually a number of fellowships of value ranging from $1,600-2,800. The Fellowships carry with them limited teaching duties; they do not include remission of fees. Bursary and loan funds are also available for graduate students (see pp. 255 and 260).
Applications for the Fellowships must be received by March 1.

Public Administration
The following awards are available:
1. For full-time study for the Master of Arts degree or the Diploma in Public Administration:
(a) one scholarship of $1500;
(b) two scholarships of $1000 each;
(c) two scholarships of $750 each.
2. For part-time study toward the M.A. or Diploma in Public Administration—ten scholarships, each equivalent to the tuition fee for the current year.
Providing that there are fully qualified applicants presently employed in the Public Service of Canada, one or more of the scholarships for full-time study will be awarded to public servants. They could then apply to their departments for educational leave with partial pay.

Applications for awards for full-time study must be received by April 1, and for part-time study by May 1. Announcement of the awards will be made shortly thereafter. Application may also be made, up to August 31, for awards not granted or taken up in April or May. A full-time Fellow or Scholar may in addition apply, at any time, for a loan of up to $1,500 or for a bursary. The required forms for such loan or bursary may be obtained from the Student Personnel Office.

Commonwealth Scholarships

Under a plan drawn up at a conference held in Oxford in 1959, each participating country of the Commonwealth offers a number of scholarships to students of other Commonwealth countries. These scholarships are mainly for graduate study and are tenable in the country making the offer. Awards are normally for two years and cover travelling, tuition fees, other university fees, and a living allowance.

For details of the awards offered by the various countries consult the Registrar of Carleton University or write to The Canadian Universities Foundation, 75 Albert Street, Ottawa. Persons doing so are advised to inquire not later than October 11 in 1965, if planning to apply for the year 1966-67.

Northern Electric Graduate Research Fellowship

Value $1500. Established by the Northern Electric Company to assist graduate students proceeding towards a Master's or Doctor's degree in Electrical Engineering, Engineering Physics, Physics, Physical Chemistry, Metallurgy or Applied Mathematics, and preferably whose thesis work can be expected to have implications for the Communications industry. The candidate must be a Canadian citizen or landed immigrant in Canada, and a graduate of a recognized university. The candidate must provide the Northern Electric Company with a copy of his thesis when it is completed.

Applications must be received by the Graduate Studies Office by April 1.

Reader's Digest Fellowships in Journalism

Two fellowships of $500 each are available to graduates in Arts who have good standing in other academic subjects and who have concentrated especially in English, History, Psychology and one or more of the social sciences. Experience in practical journalism in any medium should be reported and will be taken into account. All the material relevant to the application, including information on past experience in newspaper, magazine, radio, TV or other fields of journalism or writing, together with letters of reference from newspaper editors, must be in the hands of the Registrar, Carleton University, by August 15 of the year in which the fellowship is awarded.

Donor: Reader's Digest Association (Canada) Limited. Established 1961.

Other Post-Graduate Awards tenable at Carleton:

The awards available in greatest numbers to Canadian students are those offered by the National Research Council, the Canada Council, and the Government of Ontario. Further information is available through the Graduate Studies Office at Carleton, or through the applicant's own university.

The principal awards for overseas students are the Commonwealth Scholarships and those offered by the Canadian Government. Students should apply through the appropriate Government Education Offices in their own countries.

A full listing is given in the book "Awards for Graduate Study and Research", published by the Canadian Universities Foundation, 75 Albert Street, Ottawa.

IV. Post-Graduate Scholarships Tenable Elsewhere

Students are invited to watch the University bulletin board for notices of scholarships, and to consult the Registrar who has a number of publications outlining fellowships and scholarships available for study in the various universities in Canada and abroad.

Prizes

Clarkson, Gordon & Co. Prize
Value $100. Awarded annually to the student with the highest standing in the First year of the Commerce course. Donor: Clarkson, Gordon & Co. Established 1962.

B'nai B'rith Awards
Two of $50 each, awarded annually to students with superior academic records, progressing from one course-year to another in Carleton University. Donor: B'nai B'rith, Ottawa Lodge No. 885. Established 1947.

Faculty Club Prize
Value $25. Awarded by the Faculty Club of Carleton University to a student chosen by the President. Established 1946.

National Council of Jewish Women Award in History
Value $100. Awarded on the recommendation of the Department of History to the student achieving the best standing in Canadian History. Donor: National Council of Jewish Women, Ottawa Section. Established 1950.

National Council of Jewish Women Award in Psychology
Value $100. Awarded on the recommendation of the Department of Psychology to the student achieving the best standing in Psychology.
Donor: National Council of Jewish Women, Ottawa Section. Established 1963.

Lilian I. Found Prize for Poetry
Value $25. Offered annually for the best lyric of fifty lines or less submitted by an undergraduate of Carleton University by March 15. Details may be obtained from the Registrar's office. Donor: Mrs. Lilian I. Found. Endowed 1950.

Chemical Institute of Canada Prize
Value $25. Awarded as a book prize to the best student proceeding to the final year of the course leading to the degree of Bachelor of Science with honours in Chemistry. Donor: The Chemical Institute of Canada. Established 1950.

Roderick C. McDonald Prize in Engineering
Value $250. Awarded annually to a graduating Engineering student. Donated by Mrs. Ishbel A. McDonald in memory of her husband, Roderick C. McDonald, who, before his death in 1961, was a member of the faculty of the School of Engineering. Established 1962.

Engineering Institute of Canada Prizes
For proficiency in engineering studies and an interest in professional affairs, a prize of $200 and an engraved certificate are awarded to a deserving student completing third year Engineering, and a prize of $100 and a certificate are awarded to a deserving student completing second year Engineering.
Donor: The Engineering Institute of Canada. Established 1965.

D. F. McKechnie Prize in Accounting
The yield of a $200 fund is used each year to purchase a book prize to be awarded, when merited, to a student in Commerce for proficiency in the study of accounting. Donor: D. F. McKechnie, C.A. Endowed 1951.

Society of Chemical Industry Award
A gold key with the crest of the Society of Chemical Industry in front and the name of the winner, course, year and university on back is granted to the student who has the highest standing in the final year of the honours course in Chemistry. Winner will also receive a year's subscription to the Journal, Chemistry and Industry. Donor: Canadian Section, Society of Chemical Industry. Established 1961.

American Society for Metals Prize in Engineering
Value $25. Awarded annually to a student with high standing in the first year of the Engineering course. Donor: Ottawa Valley Chapter, American Society for Metals. Established 1951.

Henry Birks and Sons (Ontario) Ltd., Award
Value $25. Awarded annually to a Carleton University student with a superior academic record who has contributed substantially to extracurricular activities. Donor: Henry Birks and Sons (Ontario) Ltd. Established 1951.

Wilgar Memorial Prize in English
The yield of a $200 fund is used each year for a book prize to be awarded to a Carleton University undergraduate who has shown excellence in essay-writing. Established 1951, in memory of the late W. P. Wilgar, Assistant Professor of English at Carleton University, 1948-50. Endowed 1952.

Henry Marshall Tory Award
Presented annually to an outstanding graduating student who has shown a high degree of academic application, has indicated an interest in the University by broad participation in extracurricular activities of a constructive nature, has indicated qualities of leadership, and has attended Carleton University for at least three winter sessions.
Each candidate is nominated by at least five members of the Students' Association and selection is made by a committee composed of the President of the University, the Registrar, a member of the Faculty Board, and three students chosen by the Students' Council.
The Winner's name is inscribed on the master trophy and he receives a miniature replica.
The award was established in 1950 by the Students' Council of Carleton University.

H. Carl Goldenberg Book Prize
Value $25. Awarded annually as a book prize for excellence in Journalism subjects taken in the Second year of the Bachelor of Journalism Course. Donor: H. Carl Goldenberg, O.B.E., Q.C., of Montreal. Established 1953.

Kenneth R. Wilson Memorial Award for Journalism Graduates
Value about $200. Offered annually to a student graduating in Journalism who, in the opinion of a board of selection, shows exceptional promise as a future reporter and interpreter of Canadian affairs. Endowed 1953, in memory of Kenneth R. Wilson, Ottawa Editor of The Financial Post, by a group of his personal friends.

Catherine Daumery Memorial Prize for Botanical Collection
Value $35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of mounted and identified flowering plants. Donor: Anonymous. Established 1953.

Elizabeth White Memorial Prize for Zoological Collection
Value $35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of insects or arachnids, properly preserved and identified. Donor: Anonymous. Established 1953.

The Ottawa South Branch (W.C.T.U.) Prize
Value $50. To be awarded in 1966, if merited, to a student of Carleton University definitely planning to continue his studies in Divinity after graduation. The Prize is to be awarded to a student of high academic standing in the final examinations of the university year.
Donor: The Ottawa South Branch of the Women's Christian Temperance Union. Established 1953. Revised 1964.

Donald Lawrence Moulds Memorial Prize in English
Value $50. Awarded annually, if merited, on the recommendation of the Department of English Language and Literature, to an outstanding student proceeding beyond the First year of the pass or honours course in English. Established 1954 by Ernest Moulds, in memory of his son who was killed in action while serving as a Spitfire pilot in the R.C.A.F. overseas in World War II, 1942.

Alan Larocque Prize in Mathematics
Value $15. Awarded annually as a book prize to the highest ranking graduate in honours Mathematics. Donor: Alan Larocque, B.Sc., an honours graduate in Mathematics of Carleton University. Established 1956.

The Dr. M. Ralph Berke Prize in Chemistry
The yield of a $500 fund is awarded each year, if merited, on the recommendation of the Department of Chemistry for a prize to be awarded to an outstanding student majoring in Chemistry proceeding from the Second to the Third year of the degree course.
Donor: Dr. M. Ralph Berke. Established 1956.

American Society H.R.A.E. Prizes
Value $100, to be awarded 1965-66 as follows: one first prize of $75 for the best Summer Essay; one second prize of $25 for the Summer Essay.
Donor: American Society of Heating, Refrigerating, and Air Conditioning Engineers, Ottawa Valley Chapter. Established 1958.

The Ann Smith Freedman Memorial Prize
Value $50. Awarded to the student in Psychology who has gained the highest standing in the experimental paper in Psychology 200 during the academic year. Donor: Mr. and Mrs. Jarvis Freedman. Established 1958.

Prize of the Canadian Institute of Mining and Metallurgy (Ottawa Branch)
Value $75. To be awarded to a worthy student completing his second year at Carleton University and registered in one of the branches of the mineral industry; the student to have attained at least high second class honours; the selection to be made by the Dean of the Faculty of Engineering and the Chairman of the Department of Geology, jointly. Established 1956.

International Nickel Co. of Canada Ltd. Award in Journalism
For the graduating student in Journalism with the best record in the Journalism subjects, a plaque and the prize of a portable typewriter is provided by the International Nickel Company of Canada, Limited. Established 1960.

Wild of Canada Ltd., Prize in Engineering
A prize of a set of stainless steel drawing instruments is awarded annually to a student in first year Engineering at Carleton University judged most worthy of the award by the Faculty of Engineering.
Donor: Wild of Canada Limited. Established 1960.

The Chartered Institute of Secretaries Prize
A prize of $25 annually has been made available to the University for proficiency in the study of Commercial Law. Established 1963.
Donor: The Chartered Institute of Secretaries, Ottawa Chapter.

De Waan Foundation Prize on Arab Problems
Each year for a period of five years from the first year of award, the De Waan Foundation offers a prize for work of appropriate scholarly level by an upper class student on the problems of Arab countries. Annual value, $100. Students wishing to prepare for this award should first consult the Director of the School of Public Administration.
Donor: De Waan Foundation, 1960.

Frances Oakes Baldwin Prize in Journalism
Value $150. Awarded to the undergraduate with the best record in the Second year Journalism degree program.
Donor: Mrs. Frances Oakes Baldwin. In memory of the pioneers of the Kincaid district, Saskatchewan. First awarded, 1959.

The V. A. Ewing Memorial Prize
Value $100. Awarded annually, if merited, on the recommendation of the Department of Biology to a student entering his graduating year in Honours Biology who has shown outstanding application and promise in his laboratory work in experimental and descriptive Biology. Donor: Anonymous.

The Laurentian Chapter (I.O.D.E.) Award for French Studies
An award of approximately $300 has been made available, to be granted to an English-speaking Canadian student (man or woman) who is in the final year or the penultimate year at Carleton University. The purpose of the award is to help support the winning scholar in continuing studies in French, either at a Canadian university summer school, or in France. The selection will be made by a Committee of the Chapter upon recommendation by Carleton University.
Donor: Laurentian Chapter I.O.D.E.

Prize of the Ambassador of Switzerland to Canada
For excellence in the study of French and German, book prizes are offered annually by the Ambassador of Switzerland to Canada. Established 1953.

French Embassy Awards
French Embassy Book Prizes, for excellence in the study of French, book prizes are presented by the French Embassy in Canada. Established 1953.
French Embassy Medal, awarded, if merited, to a graduating student for excellence in French. Established 1955.

Prize of the Embassy of the Federal Republic of Germany
For excellence in the study of German, book prizes are offered annually by the Embassy of the Federal Republic of Germany in Canada. Established 1955.

Prize of the Embassy of Austria
For excellence in the study of German, a book prize is offered annually by the Austrian Embassy in Canada. Established 1960.

Spanish Embassy Prize
For excellence in the study of Spanish, a book prize is offered annually by the Spanish Embassy in Canada. Established 1960.

Prize of the Embassy of the Union of Soviet Socialist Republics
For excellence in the study of Russian, prizes are offered annually by the Embassy of the Union of Soviet Socialist Republics. Established 1963.

Bursaries

Applications for Ontario Dominion-Provincial Student-Aid Bursaries, Type A, and for Atkinson Charitable Foundation Entrance Bursaries (for students entering university from Ontario secondary schools) should be made through the school principals. Applications for Dominion-Provincial Student-Aid Bursaries, Type B (for students progressing from one year to another in university) should be made through the Student Personnel Officer of Carleton University after the commencement of fall classes.

Applications for student-aid grants from the Province of Quebec should be made direct to the Department of Education, Parliament Buildings, Quebec. Bursaries administered by Carleton University are awarded to students who have a sound academic standing and who show evidence of genuine financial need. Students wishing to apply for bursary assistance from the University should do so through the Student Personnel Officer by August 15.

Special Entrance Bursary Fund
The Fund is available to provide bursaries for entering students of superior academic standing, who do not hold entrance scholarships and who are in need of financial assistance.
Established by the University in 1964.

University General Bursary Fund
The fund is to provide bursaries in aid of students with satisfactory academic standing who, in the first or subsequent course-years, are in need of financial assistance. Established by the University in 1954.

Graduate Bursary Fund
The fund is to provide bursaries for graduate students with appropriate academic standing who are in need of financial assistance. Established by the University in 1958.

Provincial and Dominion-Provincial Student-Aid Bursaries
Value up to $500 each and tenable at the various colleges and universities of Canada, including Carleton University.
Candidates must be residents of Ontario and have obtained at least second-class standing in the examinations of the year prior to that for which the bursary would be used.

Charles Ogilvy Ltd., Bursary Fund
Value $1000. To provide bursaries for students with good academic standing and who are in need of financial assistance.
Donor: Charles Ogilvy Limited. Established 1960.

ATA Trucking Industry Educational Foundation, Bursary Fund
Value $1,200. To provide bursaries for First or Second year students who, due to extenuating circumstances, are deserving of financial assistance, and without such assistance would be unable to continue their studies.
Donor: Automotive Transport Association of Ontario (Inc.) Established 1959.

Altrusa Club of Ottawa Bursary
Value $100. Awarded to a deserving woman student proceeding into the third or graduating year at Carleton University. Preference to be given to a student enrolled in Science or Journalism where other qualifications are equal.
Donor: The Altrusa Club of Ottawa. Established 1962.

Ottawa Superfluity Shop Bursaries
An annual sum of approximately $180 is available to provide bursaries for veterans of World War I or World War II, or for the descendants of such veterans, who are students in good standing at Carleton University and in need of financial assistance. Endowed 1947.

Ottawa Citizens' War Services Committee Bursary
An annual sum of approximately $60 is available to assist veterans, their dependents or descendants, who are students in good standing at Carleton University and are in need of financial assistance. Endowed 1948.

Gyro Club Bursaries
Two bursaries of $250 each. Awarded annually to male students of promise who have completed at least one academic year at Carleton University, who have specific professional or vocational goals, and who, without financial assistance, could not continue their formal education. Donor: Gyro Club of Ottawa. Established 1949.

Wild of Canada Ltd. Bursary
Value $250. Awarded annually to a student majoring in Biology, with good academic standing and who is in need of financial assistance.
Donor: Wild of Canada Limited. Established 1961.

The Mary C. Grant Bursary (Laurentian Chapter, I.O.D.E.)
Value $450. Awarded annually to a particularly able student entering Carleton University or proceeding from one year of course to another, and requiring financial assistance to complete his or her studies.
The bursary has been established in honour of Mary C. Grant.
Donor: The Laurentian Chapter, I.O.D.E. Established 1962.

J. P. Bickell Foundation Bursary Fund
Value to be announced. The Trustees of the J. P. Bickell Foundation have established bursaries in the Faculty of Sciences. An applicant must be taking a normal sequence of courses leading to a degree in Geology and must have competent academic standing. Carleton students may obtain full details of the Bursary from the Student Personnel Officer. Donor: J. P. Bickell Foundation, Toronto. Established 1956.

Loyal Order of Moose Bursary
Value $200. To be awarded to an entering student of good academic standing and in need of financial assistance. Donor: Ottawa Lodge No. 1765, Loyal Order of Moose. Established 1958.

Carleton University Faculty Bursary Fund
Provided annually by the Faculty to assist students of good academic standing who have completed one academic year in the University and who are in need of financial assistance. Established 1958.

Falkland Chapter (I.O.D.E.) Bursary
Value $100. Awarded to a deserving student progressing from one year of course to another in Carleton University. Donor: Falkland Chapter, I.O.D.E. Established 1950.

Knights of Pythias, Aurora Lodge No. 53 Bursary
Value $100. Awarded to a good student, progressing from one year of course to another, who needs financial assistance to continue his or her studies.
Donor: Knights of Pythias, Aurora Lodge No. 53. Established 1960.

Atkinson Charitable Foundation Bursary Fund
The sum of $2,000 is available to assist students of Carleton University. Terms of award are as follows:
1. In addition to scholastic merit and financial need, goal and promise will be considered in selecting recipients.
2. Candidates must be residents of Ontario.
3. Applications may be for sums up to $500.
4. An applicant must have completed at least one academic year and be enrolled as a full-time undergraduate in any course at Carleton University.
5. For one of the awards, preference will be given to candidates intending later to pursue studies in Theology.
Donor: The Atkinson Charitable Foundation. Offered for the first time in 1951, as an experiment in the provision of financial aid to students.

Atkinson Charitable Foundation Entrance Bursaries
Value: $400 for students living away from home, $200 for students residing within commuting distance of the university. Candidates must be residents of Ontario and in need of financial assistance. They must obtain an average of at least 66% on eight Ontario Grade XIII examination papers, be qualified for entry to the degree course of their choice, and be sponsored by their high school principals.
Application should be made through the high school principal before May 1. Carleton University is one of the Ontario universities at which these bursaries may be held.
Donor: The Atkinson Charitable Foundation, Toronto. Established 1953.

The Maurice Frederick Carty Bursary
Value $300. To be awarded annually to a student in course who would not otherwise be able to proceed without delay to a higher year within the University. Donor: Mrs. E. G. Carty, in memory of her son, Maurice Frederick Carty. Established 1957.

The Edward Godfrey Carty Bursary
Value $300. To be awarded annually to a student in course, specifically in Engineering, who would not otherwise be able to proceed without delay to a higher year within the University.
Donor: Mrs. E. G. Carty, in memory of her husband, Edward Godfrey Carty. Established 1964.

Countess of Ashburnham Chapter (I.O.D.E.) Bursary
Value $100. To be awarded annually to a student entering Carleton University, or already in course, who is in need of financial assistance to carry on full-time studies. Donor: The Countess of Ashburnham Chapter I.O.D.E. Established 1959.

Protestant Girls' Club of Canada Bursary
Value $100. To be awarded annually to a Protestant girl or girls proceeding into the graduating year at Carleton University. Donor: The Protestant Girls' Club of Canada. Established 1955.

Arnhem Chapter (I.O.D.E.) Bursary
Value $100. to be awarded to a student with satisfactory academic standing who in the judgment of the President of Carleton University is in need and deserving of financial assistance.
Donor: Arnhem Chapter I.O.D.E. Established 1955.

R. A. Beamish Bursary
Value: approximately $250. Awarded annually to a student entering or progressing from one academic year to another who, without financial assistance, could not continue his or her formal education. To be eligible, an applicant must be a resident of one of the eleven eastern counties of Ontario (Renfrew, Frontenac, Lanark, Leeds, Carleton, Grenville, Russell, Dundas, Prescott, Glengarry, Stormont). Donor: The R. A. Beamish Foundation. Endowed 1951.

South Ottawa Kiwanis Club Bursaries
(1) Value $250. Awarded annually to a student who has completed successfully at least one academic year at Carleton University and who, without financial assistance, could not continue college studies. Donor: Kiwanis Club of South Ottawa. Established 1951.
(2) Value $250. Awarded annually to a student who has completed successfully at least one academic year at Carleton University and who, without financial assistance, could not continue college studies. Restricted to students from Ottawa and from areas outside the capital in Carleton and Russell Counties.
Donor: Kiwanis Club of South Ottawa. Established 1958.

South Ottawa Kiwanis Club (Ladies Auxiliary) Bursary
Value $100. To be awarded to a woman student who has completed one academic year at Carleton University, and who is in need of, and deserving of, assistance to continue studies as a full-time student. Donor: Kiwanis Club of South Ottawa (Ladies Auxiliary). Established 1956.

Lions Club of Ottawa (South) Inc. Bursaries
Two bursaries of value $200 each, to be awarded annually to a student of good character, who exhibits proficiency and promise, and who has completed one academic year at the University, and who, without the benefit of financial assistance, would be unable to continue his or her chosen studies. Donor: Lions Club of Ottawa (South) Inc. Established 1957.

James H. Rattray Memorial Bursaries
Value $200 each. Three bursaries for students in Science and Engineering, with certain areas of preference. (Candidates are invited to inquire about these from the Student Personnel Office).
Donor: The late James H. Rattray, M.C. Established 1961.

Engineers' Wives Association Bursary
Value $350. To be awarded annually to a deserving student enrolled in the Second year of Engineering.
Donor: Engineers' Wives Association of Ottawa. Established 1959.

Caro Murray Bursary (Earnscliffe Chapter) (I.O.D.E.)
Value $250. Awarded annually to students entering or progressing from one year of course to another at Carleton University, who have sound academic standing and are in need of financial assistance.
Donor: Earnscliffe Chapter I.O.D.E. Established 1962 in honour of Mrs. G. Scott Murray.

Ottawa Poppy Welfare Fund University Award
The Ottawa Poppy Welfare Committee offers an amount of Fifteen Hundred Dollars ($1,500.00) to be used as awards to university entrance or to assist good students who are short of funds to continue in university. The amount of an award is Three Hundred Dollars ($300.00) to any one student but this amount may be modified depending on financial circumstances.
Application forms are available at Poppy Fund Headquarters, Trafalgar House, or the Student Personnel Office, Carleton University. Donor: The Ottawa Welfare Poppy Fund Committee. Established 1956.

Philemon Wright Chapter (I.O.D.E.) Bursary
Value $75. Awarded annually to a student with satisfactory academic standing who is in need of financial assistance. Open only to residents of the Province of Quebec, with preference to those resident in the County of Hull and adjoining counties. Donor: Philemon Wright Chapter, I.O.D.E. Established 1952.

C. A. Fitzsimmons and Company Ltd. Bursary
Value $150. Awarded annually to a competent student entering Carleton University who, without financial assistance, could not continue his or her formal education. Donor: C. A. Fitzsimmons and Company Limited, Ottawa. Established 1960.

Harry Wood and Company Bursary
Value $150. Awarded annually to a deserving student in Commerce in need of financial assistance.
Donor: Harry Wood and Company. Established 1960.

The Phillips Bursary
Value approximately $200, the annual yield of a fund of $5,000 made available to Carleton University by Miss L. A. Phillips. The bursary is to be awarded each year to a student with good academic standing who is in need of financial assistance. Endowed, 1962.

The IBM-Thomas J. Watson Memorial Bursaries
Value $1,000 annually. To provide bursaries to undergraduates in any year of any faculty who are of good academic standing and in need of financial assistance. Donor: International Business Machines Company Limited. Established 1963.

The Corporation House Ltd. Bursary
Value $250. To be awarded annually to a good student in need of financial assistance, who is, in addition, a son or daughter of a parent employed in the Civil Service of Canada, or in a Federal Corporation or Agency, or serving in the Armed Forces of Canada.
Donor: Corporation House Limited. Established 1962.

The Honourable Cairine Wilson Bursary
Value $200. To be awarded annually to a good student entering Carleton University or proceeding from one year of course to another and requiring financial assistance to complete his or her studies. The bursary has been made possible by a bequest of the Honourable Cairine Wilson, first woman member of the Canadian Senate. Endowed 1962.

The M. Loeb Ltd.-IGA Bursaries
Value $2500. To provide ten bursaries of $250 each, to be awarded annually to good students either entering Carleton University or proceeding from one year of course to another who are in need of financial assistance.
Donor: M. Loeb Limited. Established 1962.

Beta Sigma Phi Sorority Bursary
Value $250. To be awarded to a deserving woman student entering Carleton University from an Ottawa Collegiate or High School. This bursary may be a continuing one for three years, provided the recipient maintains satisfactory academic standing. Donor: The City Council of Beta Sigma Phi Sorority. Established 1964.

The Hydro-Electric Power Commission of Ontario Bursary
Value $500. To be awarded annually to a student in need of financial assistance and who is entering the second year of the Honours course in Physics or Mathematics; or the second year of Engineering or Commerce.
Donor: The Hydro- Electric Power Commission of Ontario. Established 1964.

Nathan Braham Bursary
Value $200-$250. To be awarded annually to an entering or returning student, with superior academic standing who is in need of financial assistance. The bursary has been made possible by a bequest of Mr. Nathan Braham. Endowed 1964.

Steel Company of Canada, Limited Bursary
Value $500 annually. To be awarded to a good entering student who has completed his or her final year's work for university entrance in one school year. This Bursary may be a continuing one for up to four years, provided that satisfactory academic standing is maintained.
Donor: The Steel Company of Canada, Limited. Established 1965.

National Printers Limited Bursary
Value $250. To be awarded annually to an undergraduate student who has completed at least one academic year at Carleton University, and who is in need of financial assistance.
Donor: National Printers Limited, Ottawa. Established 1965.

ANAF Veterans Ottawa Unit Bursaries
Two of $150 each to be awarded annually to students entering or progressing from one year of course to another in Carleton University, who have satisfactory academic standing and are in need of financial assistance. Preference will be given to veterans or the dependents of veterans. Donor: Army, Navy and Air Force Veterans in Canada, Ottawa Unit 352. Established 1953 and 1964.

Children of War Dead (Education Assistance) Act
This act provides fees and monthly allowances for children of veterans whose deaths were attributable to military service. Enquiries should be directed to the nearest District Office of the Department of Veterans Affairs.

Loan Funds

The university administers several loan funds which are available on a short and long term basis to students in need of financial aid.
Loans made from funds held in trust by the University are repayable after termination of undergraduate studies, and bear interest at the rate of 4% per annum beginning January 1 following the termination of studies. To be eligible for a loan, a student must have a satisfactory academic record and show need of financial assistance. Applicants for loans should contact the Student Personnel Officer.

General Loan Fund

Unrestricted. In addition to loans made on the general basis outlined above, one-month loans of up to $35 may be made from this fund. Applications will be received by the Student Personnel Officer. Founded by Kenneth Brewster. Other donors: Women of Rotary, Office Staff of Carleton University, F. J. G. Cunningham, Katherine J. Milliken, Mrs. J. S. MacLean, the late Mrs. Lila Wilson, and several anonymous donors. Established 1948.

John W. Parker Loan Fund

To assist students in need of, and deserving of, financial assistance, who appear willing and able to repay their loans. Undergraduates will normally be expected to have completed at least one year at Carleton University. Applicants must present a passing grade and show evidence in their academic record of likelihood of graduation. Under normal circumstances, the maximum loan to a student shall be $500 a year, but loans up to $1,500 a year to students with dependents may be made if merited. Donor: The late Mrs. John W. Parker. Established 1955.

Canada Student Loans Plan

The purpose of the Canada Student Loans Plan is to make bank loans available to students who have satisfactory academic standing and who show evidence of genuine financial need. To be eligible a student must be enrolled in full-time studies and fulfil provincial residence requirements. Inquiries concerning the Plan should be directed to the Student Personnel Officer.

Journalism Loan Fund

Reserved for students in the course leading to the degree of Bachelor of Journalism. Founded by The Canadian Women's Press Club, Ottawa Branch. Other donors: Rielle Thomson, Kenneth Wilson, Blair Fraser, Canadian Pulp and Paper Association, Bruce Hutchison, F. P. Galbraith, Serrell Hillman, T. W. L. MacDermot. Established 1948.

Commerce Loan Fund

Preference is given to students in the course leading to the degree of Bachelor of Commerce. Founded in 1949 by the class of Commerce '49. Other donors: Class of Commerce '50.

Laurentian Chapter (I.O.D.E.) Small Loan Fund

The sum of $200 has been made available to assist in providing small emergency short-term loans to students in need. Donor: Laurentian Chapter I.O.D.E. Established 1950; revised 1959.

The English-Speaking Union (Ottawa Branch) Small Loan Fund

The sum of $400 has been made available to assist in providing small emergency short-term loans to students in need. Preference is given to students from abroad who are enrolled as full-time students at Carleton University.
Donor: The English-Speaking Union (Ottawa Branch). Established 1962.

Further information regarding existing sources of scholarships and prizes may be had from the Registrar, and regarding bursaries and loans from the Student Personnel Officer.

1965

January						
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1966

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Administrative Offices

Registrar's Office Hours

May and June

Monday and Thursday	8.30 a.m. to 12.30 p.m.
	1.30 p.m. to 4.30 p.m.
	6.30 p.m. to 8.30 p.m.
Tuesday, Wednesday, and Friday	8.30 a.m. to 12.30 p.m.
	1.30 p.m. to 4.30 p.m.

July and August

Monday and Thursday	8.30 a.m. to 12 noon
	1.00 p.m. to 4.00 p.m.
	6.30 p.m. to 8.30 p.m.
Tuesday, Wednesday, and Friday	8.30 a.m. to 12 noon
	1.00 p.m. to 4.00 p.m.

(Commencing after Labour Day)

Monday to Friday	9.00 a.m. to 12.30 p.m.
	1.30 p.m. to 9.00 p.m.

Library Hours

Summer Session

May and June

Monday to Thursday	8.30 a.m. to 4.30 p.m.
	6.30 p.m. to 10.00 p.m.
Friday	8.30 a.m. to 4.30 p.m.
Saturday	Closed

July and August

Monday to Thursday	8.30 a.m. to 4.00 p.m.
	6.30 p.m. to 10.00 p.m.
Friday	8.30 a.m. to 4.00 p.m.
Saturday	Closed

Winter Session

Monday to Friday	8.30 a.m. to 10.15 p.m.
Saturday	9.45 a.m. to 4.45 p.m.

When classes are not in session, hours vary and are posted at the entrance.

Bookstore Hours

Monday to Friday	9.00 a.m. to 4.45 p.m.
	7.00 p.m. to 9.00 p.m.